1

LOCKE’S REALISM

The aim of this essay is to untangle a badly snarled set of problems in Locke’s philosophy by picking up a loose end which has not usually been thought to lead into the heart of the tangle. This loose end is to be found in the fact that Locke, like Boyle and Newton, was an atomist. As we shall later see, neither Boyle nor Newton regarded atomism as a speculative or metaphysical system, but as an inductively confirmable theory basic to their new experimental philosophy. Therefore, when one recalls Locke’s faith in the achievements of the new science, and his high opinion of Boyle and of Newton, it is surely not surprising to find him taking the truth of atomism for granted. This, however, entailed the acceptance of a point which was to be called into question by some of his successors: unlike them, Locke was never led to doubt the existence of an independent world of physical objects. Neither did he doubt that this world actually possessed those characteristics which the new experimental science attributed to it. Furthermore, throughout his analysis of human knowledge, he viewed our experience as taking its rise from the action of physical objects upon us. To be sure, in the fourth book of the Essay, Locke did raise the question of how we can justify our belief in a world of objects lying outside of our experience; however, neither here nor elsewhere did he challenge the truth of that belief. On the contrary, his realism was, I suggest,

¹ Full references to the works and editions cited will be found in the Bibliography. In those cases in which it is likely to be useful to do so, I shall give chapter and section references, followed by a page reference to the edition which I have used. In this case the reference is to An Essay Concerning Human Understanding, Bk. IV, Ch. XI (II, 325 ff.).

² In fact, his language shows genuine impatience with such challenges.
an assumption which provided a framework within which his whole account of our knowledge was set. A passage which illustrates this fact, and which is particularly telling because of its position in the long history of the writing of the Essay, is the opening paragraph of Draft A of the Essay:

I imagin that all knowledg is founded on and ultimately derives its self from sense, or something analogous to it and may be calld sensation which is donne by our senses conversant about particular objects which give us the simple Ideas or Images of things and thus we come to have Ideas of heat and light, hard and soft which are noe thing but the reviving again in our mindes those imaginations which those objects when they affected our senses caused in us whether by motion or otherwise it matters not here to consider, and thus we doe when we conceive heat or light, yellow or blew, sweet or bitter &c. 

Looking back upon such a statement in the light of Berkeley's critique of Locke, we may of course feel that Locke is in a hopeless

For example, in the chapter just cited, he says: "I think nobody can, in earnest, be so sceptical as to be uncertain of the existence of those things which he sees and feels. At least, he that can doubt so far, (whatever he may have with his own thoughts,) will never have any controversy with me; since he can never be sure I say anything contrary to his own opinion" (Sec. 3 [II, 327]). And in Sec. 8 (II, 332) he says:

But yet, if after all this any one will be so sceptical as to distrust his senses, and to affirm that all we see and hear, feel and taste, think and do, during our whole being, is but the series and deluding appearances of a long dream, whereof there is no reality; and therefore will question the existence of all things, or our knowledge of anything: I must desire him to consider, that, if all be a dream, then he doth but dream that he makes the question, and so it is not much matter that a waking man should answer him.

In even the last edition of the Essay, when Locke raised the question of how we might justify our belief in the independent existence of physical objects, he used the same framework to explain the origins of human knowledge. For example, he says: "No particular man can know the existence of any other being, but only when, by actual operating upon him, it makes itself perceived by him." (Bk. IV, Ch. XI, Sec. i [II, 325]): also, he says: "It is therefore the actual receiving of ideas from without that gives us notice of the existence of other things, and makes us know, that something doth exist at that time without us, which causes that idea in us" (ibid., Sec. 2).
muddle. However, it is usually misleading to read intellectual history backwards, and in this case it is especially so. Berkeley challenged an important tradition which Locke had consciously and willingly accepted: the tradition of those who, like Boyle, looked upon scientific inquiry as an essential basis for sound philosophizing. In opposition to this tradition, Berkeley wished to circumscribe the philosophic import of the conclusions which were currently being drawn from experimental inquiries, and throughout his works he sought to free philosophic questions from any direct dependence upon science. Consequently, the more important the place which we must assign to Boyle, and to other representatives of the new science, in the formation of Locke's thought, the more misleading will it be to interpret Locke in the light of Berkeley's criticisms of him.

This point is of sufficient importance to bear further emphasis. I think it will be conceded that any approach to Locke through Berkeley's criticisms will be bound to stress difficulties in his doctrine of primary and secondary qualities, and in his doctrine of material substances. However, these are two points at which a wholehearted acceptance of atomism commits one to positions which are in all respects opposed to Berkeleian views. Therefore, if Locke did in fact accept atomism as a scientifically established theory, and if he also accepted science as a basis for a theory of knowledge, a fair interpretation of his actual views would have to approach his position by reading the *Essay* in the light of his atomism, and not merely as an epistemological treatise devoid of a scientific substructure. This, however, means that one should interpret his theory of knowledge in the light of his relations to Boyle, rather than merely treating him as a forerunner of Berkeley. To be sure, even when we look at Locke in these terms not all of the ambiguities and...

* In this connection it must be remembered that Boyle was looked upon as the chief proponent of atomism, and that Berkeley came to be its chief philosophic opponent.

The close personal relations between Locke and Boyle are well known. Locke became acquainted with Boyle not later than the early 1660's, and their contacts were practically uninterrupted. Boyle, who died in 1691, named Locke as one of his scientific and literary executors. As to Boyle's place in the opinion of Locke and his friends, it is surely not irrelevant that Syden-
inconsistencies in his thought will disappear. Under no circumstances can he be counted among the clearest and most consistent of philosophers. However, I hope that by looking at him in this way we shall no longer have to attribute to him that degree of obtuseness which epistemologists who favor a Berkeleyan view of the relations between philosophy and science have been pleased to attribute to him.

First, however, it will be necessary briefly to document the fact that Locke was an atomist, for this has sometimes been challenged.

I

As one example among many to illustrate Locke’s unquestioning acceptance of atomism, we may cite the following passage:

My present purpose being only to inquire into the knowledge the mind has of things, by those ideas and appearances which God has fitted it to receive from them, and how the mind comes by that knowledge; rather than into their causes or manner of production, I shall not, contrary to the design of this Essay, set myself to inquire philosophically into the peculiar constitution of bodies, and the configuration of parts, whereby they have the power to produce in us the ideas of their sensible qualities. I

Ham dedicated the first two editions of his Medical Observations Concerning the History and Cure of Acute Diseases to Boyle.

Aaron and Gibson acknowledge the great influence of Boyle upon Locke, even though they do not explore it with care. (Aaron, for example, stresses the influence of Gassendi rather than of Boyle on Locke’s atomism.) Ollian treats it at greater length, but less discriminatingly. O’Connor fails to mention Boyle. Perhaps the most careful as well as the most suggestive treatment of their philosophical relationship is to be found in Anderson, “The Influence of Contemporary Science on Locke’s Method and Results.” The reader will note, however, that my views diverge rather widely from those of Anderson.

The other study which most clearly shows Locke’s affinity to Boyle is C. Baeumker, “Ueber die Lockesche Lehre von den primären und sekundären Qualitäten.” In a doctoral dissertation entitled “John Locke und die mechanische Naturauflafassung,” W. Schröder also noted that Locke’s assumption of the truth of atomistic mechanism separated him from Berkeley and from Hume (cf. pp. 46–49).
shall not enter any further into that disquisition; it sufficing to
my purpose to observe, that gold or saffron has a power to produce
in us the idea of yellow, and snow or milk, the idea of white,
which we can only have by our sight; without examining the
texture of the parts of those bodies, or the particular figures or
motion of the particles which rebound from them, to cause in us
that particular sensation: though, when we go beyond the bare
ideas in our minds, and would inquire into their causes, we cannot
conceive anything else to be in any sensible object, whereby it
produces different ideas in us, but the different bulk, figure,
number, texture, and motion of its insensible parts.¹

Passages of this sort are to be found throughout the Essay, and they
are to be found in its earlier drafts as well. It is surely also relevant
that Leibniz classed Locke as belonging to the party of Gassendi.

We must, however, note that it is sometimes held that even
though Locke did accept the truth of atomism, he always remained
skeptical of its attempts to explain the particular phenomena of
nature. If this were true, such a skeptical reserve would separate
him from the tradition of Boyle and of other seventeenth-century
scientists, and would weaken the thesis which I here wish to support;
it is therefore necessary to face this challenge immediately.

A number of different lines of evidence have been brought for­
toward to suggest that Locke was skeptical of the usefulness of atomism
as an explanation of events in nature. One of these has been found
in his medical fragments, and another in his discussion of natural
philosophy in Some Thoughts Concerning Education; however, the
weight of the evidence must of course be found in the Essay, and
this evidence has been marshalled by R. M. Yost, Jr., in an interest-

¹ Essay, Bk. II, Ch. XXI, Sec. 75 (I, 373–74).
² For example, in Book II they are to be found in Ch. IV, Sec. 4; Ch. VIII,
Secs. 4, 11, 13–17; Ch. XXIII, Sec. 11; Ch. XXXI, Sec. 6. In Book III,
see Ch. VI, Sec. 6; in Book IV, Ch. III, Secs. 16 and 25, and Ch. X, Sec. 10
also illustrate Locke's atomism.
(The page references in the Fraser edition are as follows: I, 154–55, 167,
³ For example, Draft B, pp. 198–99 and 209. Draft C is also quite explicitly
atomistic, cf. Aaron, John Locke, p. 68.
⁴ New Essays Concerning Human Understanding, I, i (Langley ed., 65).
ing article which merits careful consideration.\(^9\) I shall deal with each of these lines of evidence in turn.

Among the medical fragments the one most frequently cited as a means of establishing Locke's skepticism regarding the usefulness of the corpuscular theory is to be found in his fragment on anatomy.\(^9\) The relevant portion of that fragment is summarized by Bourne in the following way. (I shall italicize those portions of the summary which are in Locke's own words.)

"Anatomy, no question, is absolutely necessary to a surgeon, and to a physician who would direct a surgeon in incision, trepanning, and several other operations." Locke pointed out other cases in which anatomy is useful, if not necessary, to medical practice. Then he propounded what every one now-a-days must regard as a strange heresy for such a man to hold. "But that anatomy," he said, "is like to afford any great improvements to the practice of physic, or assist a man in the finding out and establishing a true method, I have reason to doubt. All that anatomy can do is only to show us the gross and sensible parts of the body, or the vapid and dead juices, all which, after the most diligent search, will be no more able to direct a physician how to cure a disease than how to make a man; for to remedy the defects of a part whose organical constitution, and that texture whereby it operates, he cannot possibly know, is alike hard as to make a part he knows not how is made."\(^11\)

It seems to me clear that in this passage Locke is not in any way challenging the usefulness of the corpuscular philosophy; he is only challenging the usefulness of gross anatomy in medicine. (Although it is to be noted that he does not deny its usefulness in surgery.) Clearly, however, descriptive anatomy is something quite different

\(^9\) "Locke's Rejection of Hypotheses about Sub-Microscopic Events."

\(^9\) The most complete single discussion of the medical fragments is given in Bourne, *The Life of John Locke*, I, 222 ff., although it is no longer up to date. For a summary of the known extant materials, cf. Romanell, "Grant No. 2227 . . . " as cited in the bibliography. For a recent re-editing of Locke's "De Arte Medica" fragment, cf. Gibson, *The Physician's Art*.

from investigations of the submicroscopic constituents of material objects, and in this passage it is precisely because gross anatomy does not penetrate beyond "the gross and sensible parts of the body," and does not reveal "the organical constitution, and that texture whereby it operates"—that is, because it does not reach the submicroscopic level of the corpuscular parts—that it fails to be useful for the physician. To be sure, Locke does not say here that the corpuscular view of matter can itself be of positive use to the physician, but that question was not one which would necessarily be involved in a treatise on the uses and limits of anatomy.

In another of the medical fragments, De Arte Medica, which has also been cited in this connection, Locke was surely not attacking the modern corpuscularians, but was only concerned to attack "hypotheses." As we shall see, that term was used by Newton and others to refer to what might best be called "metaphysical" explanations, in contradistinction to empirical hypotheses. What seems to have misled commentators in this matter is the fact that in his

12 The words "constitution" and "texture" are reminiscent of Boyle, and it would surely be a mistake to think that Locke could write in this vein without having in mind Boyle's repeated defenses of the usefulness of the corpuscular theory for the physician. While Boyle's most explicit defense of this usefulness is to be found in a work entitled "On the Reconcilability of Specific Medicines to the Corpuscular Philosophy" (Works, V), which postdated the fragment here in question, the same position was held by him in numerous earlier works, e.g., in "The Usefulness of Experimental Philosophy" (Works, II, 170-73). Also, in the same year as Locke's fragment "On Anatomy," one finds that Glanvill, on the basis of information furnished him by Oldenburg, seems to have been aware of Boyle's views regarding the question (cf. Plus Ultra, p. 105). Thus we may take this view as having been known, and undoubtedly accessible to Locke.

13 Cf. Yost, "Locke's Rejection . . . .," p. 129. In this fragment Yost summarizes Locke's position in the following way (again I italicize Locke's words):

He rejected all attempts to advance medicine by trying to discover "the hidden causes of distempers, . . . the secret workmanship of nature and the several imperceptible tools wherewith she wrought," believing these matters to be "utterly out of reach" of man's apprehension.

This, however, is a misleading summary, for the words quoted from Locke refer to "the learned men of former ages" who "putting all these fancies together, fashioned to themselves systems and hypotheses" (cf. Bourne, The Life of John Locke, I, 223). Clearly, however, this polemical tone would not have been adopted with respect to Boyle's form of the corpuscular theory.
medical writings Locke continually insisted upon the "historical" method, and this has not unnaturally been identified with the method of Sydenham: a method which presumably did not seek explanations, even in the form of empirical hypotheses, but confined itself to rules of practice based on past observation. However, Locke's use of the term "histories" may also have been influenced by Boyle, for whom "a history" did not stand opposed to an experimental inquiry, but was a means of reaching or testing an empirical hypothesis. It was in fact through his "histories" that Boyle sought to establish the applicability of the corpuscular hypothesis in case after case. And it is also to be noted that Boyle, although the staunchest defender of the usefulness of the corpuscular philosophy, believed in the usefulness of nonatomistic explanations as well. Therefore, Locke's emphasis on the utility of Sydenham's method does not suggest that he disbelieved in either the truth or the usefulness of the corpuscular philosophy. At most it proves that he did not believe that it was as yet of use to the practicing physician.

14 Cf. Yost, "Locke's Rejection . . .," p. 129, and Romanell, "Locke and Sydenham," especially pp. 315-17. Romanell's interpretation of Locke is somewhat similar to that of Yost, but is based on less evidence and wholly overlooks the extent to which Locke was an atomist. Furthermore, Romanell's attempt to find the source of the Essay in Locke's medical interests is unconvincing. (For other criticisms of this article, cf. Cowan, "Comments on Dr. Romanell's Article.")

15 This seems to be overlooked by Yost, "Locke's Rejection . . .," p. 127, n. 33. On Boyle's use of the term "histories," cf. below, p. 96, n. 66.

I do not wish to suggest that Locke's use of the term "historical" is wholly dependent on Boyle. In fact, it seems to me to be simply a term used in opposition to speculation and metaphysical reasoning, and not one which designated a specific procedural method at all. For example, when Locke says that in the Essay he will follow "the historical, plain method" (Intro., Sec. 2, [I, 27]), it seems hard to believe that he thought he was applying either Sydenham's method or Boyle's method to the problem of analyzing the origins, certainty, and extent of human knowledge. What he obviously did believe he was doing was giving a careful analytic account of these matters, and careful analysis was a feature which was common to the methods advocated by both Sydenham and Boyle. For an example of his use of "history" in this sense, cf. Essay, Bk. III, Ch. XI, Sec. 24 (II, 161).


17 It is to be noted that Boyle himself defended its usefulness in a programmatic way: he did not claim that the corpuscular philosophy could immediately be applied to the treatment of disease. Cf. the Prefatory Letter to "On the
The second major passage upon which a denial of Locke's trust in the new corpuscular philosophy might be based is to be found in his discussion of natural philosophy in sections 193 and 194 of *Some Thoughts Concerning Education*. In this passage Locke contrasts systems of natural philosophy with science, and finds all such systems wanting, though he admits that "the modern corpuscularians talk, in most things, more intelligibly than the peripatetics, who possessed the schools before them." This, of course, is small praise, especially in the light of the fact that Locke only commends the study of systems of natural philosophy as a means of being able to understand the concepts frequently employed in polite society. But it is to be noted that the term "the modern corpuscularians"—a term apparently coined by Boyle—included Descartes as well as the atomists. In fact, since in the same passage Locke explicitly excluded Boyle's works from the systems of natural philosophy, and since these works—along with the works of Newton—are recommended to the reader in preference to such systems, it seems not far-fetched to think that the modern corpuscularians whom Locke here had in mind were primarily Descartes and Gassendi, and their followers. Thus, this passage can scarcely be interpreted as express-

Reconcileableness of Specific Medicines to the Corpuscular Philosophy" (*Works*, V, 74, 75).

It is also worth noting that Locke added a passage in the second edition of the *Essay* which must surely be taken as a criticism of the alchemists (Fraser's footnote to this passage is wholly misleading), and as praise of Boyle's methods. This passage (Bk. IV, Ch. III, Sec. 16) will be mentioned in another connection in note 115, below.


19 Otherwise, could Locke have said that the modern corpuscularians immediately succeeded the peripatetics? Boyle, of course, himself included Descartes, along with Gassendi, as a corpuscularian: cf. Boyle, *Works*, I, 355.


20 Locke's notebooks show his great interest in Descartes at the time he was working on the *Essay* (cf. the selections from them given by Aaron and Gibb in *Draft A*).

He could not fail to have known Gassendi's works which were available when he was at Oxford, and which Boyle frequently cited. Although Locke only once, to my knowledge, cites Gassendi's name in those of his works which are thus far available (cf. his third letter to Stillingfleet, *Works*, IV, 420),
ing doubt as to the validity, or the scientific usefulness, of atomism as such. On the contrary, it must be interpreted as endorsing the sort of atomism to be found in Boyle and Newton, and restricting its adverse criticism to those systems of natural philosophy which did not conform to what Locke took to be the new experimental method.21

But what, finally, shall be said concerning R. M. Yost’s contention that even though Locke did in fact accept atomism he, “unlike many scientists and philosophers of the seventeenth century, . . . did not believe that the employment of hypotheses about sub-microscopic events would accelerate the acquisition of empirical knowledge”?22 A full answer to this contention would involve an examination of all of the passages which Yost uses in his argument, and a comparison of his reading of these passages with the reading which would follow from the interpretation of Locke’s position which I wish to set forth. Needless to say, I shall not here engage in a detailed examination of this sort.23 Instead, I shall bring forward

Aaron has quite rightly stressed the probable influence of the Gassendist s on Locke (cf. John Locke, pp. 31 ff., passim). As is well known, Locke did have personal contacts with Bernier, the chief expositor of Gassendi, and he may even have lodged in Paris with another of Gassendi’s popularizers, Gilles de Launay. (On both points, cf. Lough’s edition of Locke’s journals, entitled Locke’s Travels in France. To what Lough states, one must however add that the mere fact that the journals do not cite Bernier in any connection other than that of an oriental traveler does not in the least suggest that Locke was not fully aware of his philosophy, nor that he did not know Bernier’s Abrégé de Gassendi. In this connection one may note that in his reply to Stillingfleet, cited above, Locke explicitly mentions the name of Bernier along with Gassendi.)


22 Yost, “Locke’s Rejection . . .,” p. 111. Another way in which Yost puts his point is to say that Locke differed from these scientists and philosophers by denying that “the nature of sub-microscopic events are discoverable” (cf. p. 120, which refers back to p. 112). This, of course, is a different and more radical point, although Yost does not distinguish between his two statements of his argument. I shall phrase my objections to Yost’s interpretation of Locke in such a way as to allow them to be applicable to either interpretation of his thesis.

23 The passages which Yost (ibid.) cites from the Essay in support of his thesis are: Bk. II, Ch. XXIII, Sec. 32, and Ch. XXXI, Sec. 6; Bk. III, Ch. VI,
one consideration which seems to me to constitute fairly strong prima facie evidence against Yost's contention, and shall then suggest two points at which his interpretations seem to me to be misleading.

The prima facie evidence which I would cite against Professor Yost is the fact that in his "Epistle to the Reader," Locke spoke of Boyle, "the great Huygenius," and "the incomparable Mr. Newton" as the master builders of the age—yet all were staunch advocates of the corpuscular hypothesis, and employed it in their scientific researches.\(^{24}\) Furthermore, if Yost's interpretation were correct it is difficult to understand why in all those passages in which he interprets Locke as arguing against the usefulness of the corpuscular hypothesis, Locke never once raised objections against Boyle or the other atomists. Furthermore, in all of those passages in which Locke expressed his disinclination to enter into a detailed discussion of the constitution of material objects and of their action upon us, I find no implied skepticism whatsoever concerning the adequacy of such accounts: Locke merely holds that these problems were not part of the task which he set himself.\(^{25}\)

Turning now to the more specific reasons why Professor Yost's interpretation of the relevant passages seems to me to be dubious, the first point which I should wish to make is that he fails to take into account the fact that one of Locke's fundamental motives was to stress the limitations of all human knowledge. When we take

Secs. 8 and 9, and Ch. X, Sec. 19; Bk. IV, Ch. III, Secs. 25, 26, 29, Ch. VI, Secs. 5, 11, 13, Ch. VIII, Sec. 9, Ch. XII, Secs. 10, 11, 12, and Ch. XVI, Sec. 12.

\(^{24}\) On Newton's acceptance of the corpuscular hypothesis, and on the problem of whether the usual positivistic interpretation of his philosophy of science is adequate, the reader is referred to the next chapter.

At this point I should also like to note that if there really had been a contrast in Locke's mind between Sydenham's historical method and the corpuscularian hypotheses of Boyle, Huyghens, and Newton, as Yost seems to believe that there was, it would have been strange for Locke to have linked their names in his "Epistle to the Reader."

\(^{25}\) One such passage has already been quoted, cf. pp. 4 f., above. Other well-known statements in the same vein are to be found in Introduction, Sec. 2 (I, 26), in Bk. II, Ch. VIII, Sec. 22 (I, 177 f.), and Bk. II, Ch. XXI, Sec. 2 (I, 503 f.) of the Essay.
into account this desire to restrain the claims and pretensions of men, it is not unnatural that Locke should stress the limitations of our knowledge of the internal structure of corporeal substances. Such a stress need not then be regarded as evincing any special reserve concerning scientific inference; it would merely be one application of Locke’s general contention that all of our knowledge is limited to what is suitable to our estate.\(^{26}\) Furthermore, it should be noted that in these discussions a modern reader may discern a more skeptical note than was actually intended by Locke, for in Locke’s terminology there is an absolute difference between what is to be denominated as “science” or “knowledge,” and what was to be called “opinion” or “probability.”\(^ {27}\) Bearing these points in mind, many of the passages cited by Yost seem to me not to express skeptical reserve concerning the corpuscular hypothesis. What I find lacking in Yost’s treatment of them is an analysis of each of these passages in its context, and an attempt to determine against what or whom each was directed. Such analyses seem to me to show that Locke was attacking certain widespread human pretensions, and dogmatism, and that his opponents were not in fact the atomists of his age.\(^ {28}\)

\(^{26}\) For example, cf. \textit{ibid.}, Bk. II, Ch. XXIII, Sec. 12–13.
\(^{27}\) While Yost (“Locke’s Rejection . . .”) recognizes this distinction in Locke (cf. p. 123) he does not—it seems to me—exercise sufficient care in applying it when interpreting some of the passages with which he deals. (For example, compare his use of Bk. IV, Ch. III, Sec. 26 on p. 125 f. of his article with the place of that discussion in the \textit{Essay}.)
\(^{28}\) Furthermore, in the passages quoted by Yost, Locke’s opponents are sometimes “the Schoolmen.” For example, in the \textit{Essay}, Bk. III, Ch. VI, Secs. 8, 9, and 10, Locke is putting forward his own doctrine of the contrast between the nominal essences and the real essences of substances in opposition to a scholastic doctrine of species. What Sec. 9 aims to show is that we do not reach real essences through “sorting” things and “disposing them into certain classes under names,” that is, through using their nominal essences. That this passage should be used by Yost as a key part of the direct evidence for his thesis seems to me to illustrate the importance of trying to determine against whom Locke is arguing. I cannot see that it can be taken as arguing against the corpuscular views of his contemporaries when it is read in connection with the preceding section (Sec. 8) on “species” and the succeeding section on “substantial forms.”

Similarly, in “An Examination of P. Malebranche’s Opinion of Seeing All Things in God,” which was written in approximately 1694, but was only posthumously published, Locke clearly accepts an account of sense perception
This brings me to the second point at which Yost's interpretation seems to me to be in error. Throughout the Essay Locke is primarily concerned with our ordinary everyday knowledge, and not with the problems of scientific inference. Furthermore, whether consistently or not, Locke always draws a contrast between our "sensible ideas" and "insensible corpuscles," between what is accessible to us in direct experience and the real essences of objects. Professor Yost tends to interpret all such passages as expressing skepticism regarding the possibility of attaining reliable explanations of phenomena in terms of their atomic constitutions. However, when we recall that Locke is really concerning himself with our everyday experience, and not with scientific inference, these passages take on a quite different meaning: not being concerned with the problem of how we know the internal constitution of things, the accent in these passages falls on the disparity between common knowledge and the fruits of scientific inquiry. What is of course lacking is an analysis of scientific inquiry, and a justification of scientific inference to "insensible corpuscles." However, if we may assume that

which is based on corpuscularianism, and he rejects both the Scholastic doctrine of "sensible species" and any nonrealistic interpretation of the physical processes involved in the action of objects on our sense organs (Sec. 9–15, to be found in Works, IX, 215–19).

I am pleased to find that David A. Givner, in a recent article entitled "Scientific Preconceptions in Locke's Philosophy of Language," takes the same view of Locke's corpuscularianism and its relation to real and nominal essences as I have proposed and will more fully discuss on pp. 41–46, below.

Yost recognizes that "Locke never wrote a treatise or even a chapter that was devoted exclusively to the methods of science" ("Locke's Rejection . . . ," p. 120). While I would certainly have no quarrel with Yost's further statement that it is likely that Locke thought a good deal about the methods of empirical science and had well-considered opinions concerning them, it does not follow that when, in the Essay, Locke is stressing the limitations of human knowledge in general, he should be taken as stressing the limitations of scientific knowledge.

For example, cf. Bk. III, Ch. VI, Sec. 9, and Bk. IV, Ch. III, Sec. 25.

For example, in one of the key passages (Essay, Bk. II, Ch. XXXI, Sec. 6) which Yost cites in favor of his interpretation (cf. "Locke's Rejection . . . ," p. 125), the context of the passage is that of "the common idea men have" of substances such as iron or gold; it is not a discussion of what we learn through scientific inquiry. (The phrase I have quoted appears two sentences before the point at which Yost's quotation begins.)
Locke did believe that his scientific contemporaries were "master-builders, whose mighty designs, in advancing the sciences, will leave lasting monuments to the admiration of posterity," he may perhaps be excused for not having challenged their assumptions. If, then, we read those passages in which he draws a contrast between common experience and science in terms of his admiration for the natural scientists of his day, rather than in terms of Berkeley's challenge to these same scientists, Yost's reading of these passages is, in my opinion, open to serious doubt.

The conclusion which I wish to draw from the evidence to which I have here alluded is that Locke, throughout his career, was an atomist, and that he accepted both the truth and the scientific usefulness (or, at least, the scientific promise) of the corpuscular, or new experimental, philosophy. Neither the early fragment on anatomy (1668) nor the late passage in the essay on education (1693) throw doubt on the fact that Locke was, at these times, an atomist. Between these two dates, and even subsequently, there are clear indications of his acceptance of an atomistic view of matter: they are to be found in Draft B (1671), in Draft C (1685), and in approximately equal measure in all editions of the Essay, from the first, in 1690, to the fourth (1700), which was the last which was published during Locke's lifetime.32 And, to repeat my prima facie argument against Professor Yost, it would seem strange that Locke never explicitly challenged the atomistic assumptions of his contemporaries among the scientists—nor did he ever qualify his praise of their "mighty designs"—if in point of fact he doubted the utility

32 It is to be noted that I find no particular developmental transition in Locke's thought so far as his general epistemological views are concerned, but simply a working out of them in greater detail. Strangely enough, Thompson, whose Study of Locke's Theory of Ideas, attempted to trace a development in Locke's thought, fails to explain why, if there were this development, Locke left so much of his earlier thought in the later editions. It is also to be noted that the discovery of Draft A undercuts a good deal of Thompson's thesis. Even before the discovery of Draft A, however, the early materials contained in King, and used by Fraser, might have forewarned Thompson that much of Locke's supposedly later thought (which Thompson holds arose out of his concern with nominal vs. real essences) was in fact present from his earliest concern with the problem of language.
of the atomistic view of physical objects. Therefore, I shall take it as fixed throughout the remainder of this discussion that Locke can be interpreted as an atomist.

II

One reason why Locke's atomism has received so little attention may perhaps be found in the fact that atomism seems to be incompatible with a number of other doctrines which are usually regarded as being most characteristic of his thought. In the first place, atomism seems to be incompatible with the view that all knowledge has its source in sensation and reflection, for the "insensible" (i.e., imperceptible) parts of matter cannot, by definition, be presented to us in sensory experience, and knowledge of such particles cannot, of course, be gained through acts of reflection (i.e., through introspection). It would therefore seem that Locke could not be true to his own theory of knowledge and also accept atomism as a correct theory of the nature of bodies. In the second place, in his well-known distinction between primary and secondary qualities Locke states that "the ideas of primary qualities of bodies are resemblances of them, and their patterns do really exist in the bodies themselves;" 33 yet no atomist can consistently hold that the specific qualities which we perceive when we look at or when we touch material objects are identical with the qualities which these objects, when considered as congeries of atoms, actually do possess. For example, the continuous contour which characterizes the perceived shape of an object such as a table cannot be considered by an atomist to be a wholly adequate representation of that object's true shape. Now, since it is indisputable that Locke did draw a distinction between primary and secondary qualities, and since he also insisted that our ideas of primary qualities "resemble" these qualities in a way in which our ideas of secondary qualities do not, it is easy to assume that his atomism should not be taken seriously. In the third place, one would not expect a genuine atomist to have made the

33 Essay, Bk. II, Ch. VIII, Sec. 15 (I, 173).
statements which Locke did make when he analyzed our notion of "substance," nor to have insisted, as he did insist, on the unknowability of the real essences of material objects. In short, in each of these areas of his thought, Locke's atomism would appear to be incapable of reconciliation with his fundamental epistemological convictions. What I shall now attempt to show is that this is not the case. I shall, however, start with the second apparent conflict, that concerning his doctrine of primary qualities, leaving until later the more general question of how, if at all, Locke could reconcile his acceptance of atomism with his views regarding the origin of all knowledge.

Turning, then, to the passage in which Locke states that "the ideas of primary qualities of bodies are resemblances of them, and their patterns do really exist in the bodies themselves" we must note that this passage is usually interpreted to mean that, for Locke, "the ideas of the primary [qualities] are exact representations of these qualities." As we have already noted, the passage so interpreted is surely inconsistent with an acceptance of atomism. However, it is also to be noted that Locke's famous sentence is by no means unambiguous, since the notion of "resembling" and the notion of "being a pattern" leave considerable latitude in the relationship which could obtain between our ideas of primary qualities and those qualities themselves. To be sure, in some passages Locke speaks as if the quality and the idea were actually identical, but he cannot have meant this, for when he speaks cautiously he always distinguishes between an idea which is in us and a quality which is in a body. (In fact, he explicitly warns us that even when he speaks incautiously we are not to understand him as meaning that ideas are in the things themselves.) Thus the question arises as to how close a resemblance there is between an idea of a primary quality and that quality as it exists in the object which possesses it.

Unfortunately, Locke is never really explicit with respect to this

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Aaron, John Locke, p. 116.
A similar interpretation is adopted by Prichard in Knowledge and Perception, p. 115, and by Broad in Scientific Thought, p. 282.

Essay, Bk. II, Ch. VIII, Sec. 8 (I, 169).
Locke's Realism

point. I have noted some thirteen apposite cases in which he makes use of the concept of "resemblance," and in many of them he couples this term with the notions of "similitude" or "likeness," or with the term "images," yet most of these cases permit of alternative interpretations. The most usual interpretation, as we have noted, is that Locke believed that the idea of a primary quality is a direct image of that quality, resembling it as perfectly as, say, a plaster cast might resemble the statue from which it was cast. Yet I do not believe that Locke actually held this doctrine. The clearest indication that he did not do so comes from the famous passage in which he says: "Had we senses acute enough to discern the minute particles of bodies, and the real constitution on which their sensible qualities depend, I doubt not but they would produce quite different ideas in us." To be sure, Locke, then goes on to list illustrations of how, under these conditions, our ideas of the color of objects would be changed; however, the shape too would be changed, as he recognizes in the following section, when he says:

If that most instructive of our senses, seeing, were in any man a thousand or a hundred thousand times more acute than it is by the best microscope, things several millions of times less than the smallest object of his sight now would then be visible to his naked eyes, and so he would come nearer to the discovery of the texture and motion of the minute parts of corporeal things.

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36 For these cases, cf. ibid., Secs. 7, 13, 15, 16, 18, 22, and 25; and Bk. II, Ch. XXX, Sec. 2. (Since some of these sections contain several relevant uses of these terms I have mentioned a total of thirteen cases, but I place no special emphasis on this number.)

In addition, as we shall see, Locke's use of the term "pattern" is of importance, and in the famous sentence which I have quoted he links the notions of "resemblance" and of "patterns." For his use of "patterns" and "archetypes," cf. also Bk. II, Ch. XXX, Sec. 2; Bk. II, Ch. XXXI, Sec. 3; Bk. II, Ch. XXXII, Secs. 16, 18, and 26; Bk. III, Ch. IV, Sec. 17; Bk. III, Ch. V, Secs. 3 and 12; Bk. III, Ch. VI, Sec. 5; Bk. IV, Ch. IV, Secs. 5, 8, 11, and 12.

37 I do not suggest that the resemblance would be as perfect as that between two statues cast from the same mould, since I assume that ideas are to be interpreted as "mental entities," and the "stuff" of which they are composed would therefore be different from that of the qualities of bodies.

38 Essay, Bk. II, Ch. XXIII, Sec. 11 (I, 401).

39 Ibid., Sec. 12 (I, 403). In the same section (p. 402) Locke had already
In the light of this passage, and especially in the light of Locke's often repeated insistence that God created our organs of sense (as well as all of our other faculties) for the ordinary concerns of our life, and not that we might achieve perfect knowledge, it is difficult to accept the conventional view that he believed that our ideas of the primary qualities of macroscopic objects exactly resemble these qualities as they exist in the objects themselves.

Furthermore, if this were Locke's doctrine with respect to what he means by the primary qualities of objects, it would be extremely odd to find him holding that the powers of objects to affect other objects—as fire affects the consistency or color of wax or of clay—are due to the primary qualities of these objects: the power of fire must be held to depend upon "the bulk, texture, and motion of its insensible parts," not upon anything which exactly resembles the qualities which we directly perceive it as possessing.

Finally, we may note that Locke is willing to suggest an account of our visual perception of "the extension, figure, number, and motion of bodies of an observable bigness," and this account invokes the action of "singly imperceptible bodies" (i.e., particles) which come from the objects to our eyes and convey a motion to our brains. Such an account of the origins of our ideas of the so-called primary qualities of macroscopic objects surely demands that we relinquish the view that our ideas of the qualities of these objects are replicas of the qualities as they exist in the bodies themselves: that which exists independently of us, and causes our ideas of the primary qualities of an object, is not itself capable of being perceived. In fact, throughout these important sections of Chapter VIII it is clear that Locke's real criterion of what constitutes a primary quality in said: "Were our senses altered, and made quicker and acuter, the appearance and outward scheme of things would have quite another face to us." This statement cannot, in its context, be taken as applying to the so-called secondary qualities only.

Ibid. (p. 402); cf. also Bk. II, Ch. XXX, Sec. 2, and Bk. II, Ch. XXXI, Sec. 2, as well as "The Epistle to the Reader."

Ibid., Bk. II, Ch. VIII, Sec. 10 (I, 171).

an object is not to be ascertained by asking which of our ideas resemble the qualities of the object itself; it is to be ascertained by asking which of the qualities of bodies produce ideas in us. The latter are the primary qualities of bodies, as Locke continually insists. And that is why in these sections he can also call these qualities the original qualities of bodies.

This was precisely the doctrine held by Boyle, who also spoke of “the primary qualities” as “the original qualities.” (Boyle also referred to them as “primitive,” as “absolute,” and as “the catholic affections of matter,” all of these terms being synonymous for him.) Now, Boyle contrasted these qualities with “sensible qualities,” and the latter included all of the qualities perceived by sense, that is, they included shape and size no less than color and warmth. In fact, Boyle said: “We must not look upon every distinct body that works upon our sense as a bare lump of matter of that bigness and outward shape that it appears of; many of them having their parts curiously contrived, and most of them perhaps in motion too.” This position, it seems to me, is inescapable for any atomist, and was in fact also Locke’s position.

Looked at in this light we can, I believe, make far more sense of Locke’s doctrine than is usually done. The primary qualities are

\[43\] Draft C is especially clear on this point. (Cf. Aaron, John Locke, p. 62 f.)


\[46\] Works, III, 24.

\[48\] It is perhaps relevant to cite a passage from the Essay, Bk. II, Ch. XXXI, Sec. 6, although the special context of that passage is such that I would not wish to place too much weight on it. Locke says:

The particular parcel of matter which makes the ring I have on my finger is forwardly by most men supposed to have a real essence, whereby it is gold; and from whence those qualities flow which I find in it, viz. its peculiar color, weight, hardness, fusibility, fixedness, and change of colour upon a slight touch of mercury, &c. This essence, from which all these properties flow, when I inquire into it and search after it, I plainly perceive I cannot discover . . . . For I have an idea of figure, size, and situation of solid parts in general, though I have none of the particular figure, size, or putting together of parts, whereby the qualities above mentioned are produced. (I, 508–9. My italics added.)

\[47\] An exception to this stricture is to be found in Reginald Jackson’s article, “Locke’s Distinction between Primary and Secondary Qualities.” I agree...
those which produce all of our ideas of objects; they produce our ideas of the so-called secondary qualities as well as our ideas of the primary qualities. But having said this we may now ask what these primary qualities are like: do any of our ideas resemble them? And it is here that Locke answers that in all matter, constituting its primary qualities, there are certain general characteristics which we also find in certain aspects of our sensory experience, e.g., bulk, figure, number, and motion. According to Locke, there are two grounds on which these characteristics can be argued to be “utterly inseparable from body, in what state soever it be.”\footnote{Essay, Bk. II, Ch. VIII, Sec. 9 (I, 169). This phrase is somewhat different from that contained in the first edition, but the change does not seem relevant to my point. The subsequent argument based on sense and reason is in the first edition as well as in later editions.} First, because “sense constantly finds [them] in every particle of matter which has bulk enough to be perceived.” Second, because “the mind finds [them] inseparable from every particle of matter” even though it may be too small to be perceived. In other words, it is on the basis of generalizations, and not through immediate sensory experience, that we hold such qualities to be inseparable from matter. Thus, Locke believes (though with what right I shall not here inquire) that we may validly say that those material objects which act upon us to produce our ideas, do actually possess the primary characteristics of bulk, figure, number, and motion; however, he does not identify these characteristics as they exist in such objects with the specific ideas of bulk, or figure, or number, or motion, which their action upon us causes us to have.

Now, it may be asked why, if my interpretation be correct and

with Jackson when he says: “Locke means by ‘primary qualities of bodies’ simply qualities of bodies . . . he calls them ‘primary’ to distinguish them not from other qualities as a kind of qualities, but from what are on his view only wrongly thought to be qualities” (pp. 57–8). Jackson then adds that for Locke these qualities are imperceptible, and with this too I agree. However, I am inclined not to share Jackson’s view on a number of other points. Nonetheless, my disagreements with Jackson’s interpretations are relatively minor compared with our fundamental agreement, viz. that Berkeley and subsequent philosophers have misinterpreted Locke’s doctrine of the primary qualities. Cf. also Jackson’s second article on Locke, “Locke’s Version of the Representative Doctrine of Perception.”
the real criterion of what constitutes a primary quality should be identified with that which produces our ideas, and not with that which is like certain of our ideas, Locke nonetheless so frequently speaks in terms of "resemblances." The answer is clear: he was contrasting the ontological status of these original or primary qualities with the status of the so-called secondary qualities. The latter are not qualities at all, for they exist only as ideas in us. Furthermore, they do not resemble their causes: we would never know what the bulk, figure, motion, (etc.) of the insensible particles were like merely by examining our ideas of blueness, sweetness, warmth, (etc.). On the

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49 Cf. ibid., Ch. XXXI, Sec. 2 (I, 503), where Locke says:
Since were there no fit organs to receive the impressions fire makes on the sight and touch, nor a mind joined to those organs to receive the ideas of light and heat by those impressions from the fire or sun, there would yet be no more light or heat in the world than there would be pain if there were no sensible creature to feel it, though the sun would continue just as it is now, and Mount Aetna flame higher than ever it did. Solidity and extension, and the termination of it, figure, with motion and rest, whereof we have the ideas, would be really in the world as they are, whether there were any sensible being to perceive them or no: and therefore we have reason to look on those as the real modifications of matter, and such as are the exciting causes of all our various sensations from bodies.

In this passage it should be clear that while Locke would say that our ideas of solidity and extension "resemble" qualities which exist in bodies independently of our perception of them, his emphasis is not at all placed on the resemblance between a specific idea of, say, the shape of the sun and the shape which it possesses independently of our perception: rather, he is concerned with the problem of what types of qualities exist in nature and what types of qualities are mind-dependent. That this is also Locke's view in Chapter VIII of Book II will be argued in some detail below.

At this point, however, we may also adduce as evidence the fact that this was precisely Boyle's view as well. In a passage cited by Fraser, but without a reference, Boyle said: "If there were no sensitive beings in existence, bodies that are now the objects of our senses would be dispositively endowed with colors, tastes, &c; but actually only with those more catholic affections, as figure, motion, texture, &c., which are called primary" (apud note 4 to page 170 of volume I, of the Fraser edition of Locke's Essay). Fraser's own treatment of Locke's view in his earlier book is ambiguous, but seems strongly to suggest that he took the traditional view of what Locke meant by the "resemblance" of our ideas of the primary qualities to the qualities themselves (cf. Fraser, Locke, pp. 199-201).

50 This is clearly stated by Locke in a passage in Draft C (cf. Aaron, John Locke, p. 63).
other hand, by examining our ideas of the shape and bulk (i.e., solidity) and motion of a snowball, we can know what shape, bulk, and motion mean when they are predicated of atoms: the "patterns" of perceived shape, bulk, and motion do exist in the objects. In this sense, perceived objects resemble their causes with respect to the so-called primary qualities and not with respect to the so-called secondary qualities. The fact that the shape which we perceive may not be identical with the shape which is a quality of the object does not obliterate this distinction between primary and secondary qualities, for not only is there a lack of identity between the perceived color (or sound, or taste) and any quality in the object, there is nothing which resembles color or sound or taste in the object itself.

There is, as Locke has it, no pattern for these ideas within the object.

This interpretation of Locke's doctrine may perhaps be considered to involve so radical a departure from what has usually been taken for granted that further textual evidence in its favor should be adduced. Let us therefore start with a passage which may seem to be especially damaging, the opening of Section 18 of Book II, Chapter VIII. There Locke states:

A piece of manna of a sensible bulk is able to produce in us the idea of a round or square figure; and by being removed from one place to another, the idea of motion. This idea of motion represents it as it really is in manna moving; a circle or square are the same, whether in idea or existence, in the mind or in the manna. And this, both motion and figure, are really in the manna, whether we take notice of them or no.

Taken in isolation, this passage might seem to demand an acceptance of the traditional interpretation of Locke's doctrine of primary qualities, that is, that our ideas of these qualities exactly resemble the qualities as they exist in the objects themselves. However, if we examine what comes immediately before this statement, and what comes after it, we can see that Locke is concerned with a different problem: he is attempting to distinguish between those types of sensibilia which represent, and those which do not represent, the types of qualities which are present in independently existing objects. In other words, I wish to contend that in this passage Locke is not
Locke’s Realism

dealing with the problem of the extent to which specific perceptual experiences may be said to be veridical, but with the question of the extent to which certain types of ideas represent the types of qualities which exist in these objects independently of our perception of them. That this is Locke’s concern in the above statement can be made plausible in a series of steps.

First, such an interpretation is suggested by the sentences which comprise Section 17, the immediately preceding section of this chapter. These sentences read:

The particular bulk, number, figure, and motion of the parts of fire or snow are really in them,—whether any one’s senses perceive them or no: and therefore they may be called real qualities, because they really exist in those bodies. But light, heat, whiteness, or coldness, are no more really in them than sickness or pain is in manna. Take away the sensation of them; let not the eyes see light or colours, nor the ears hear sounds; let not the palate taste, nor the nose smell, and all colours, tastes, odours, and sounds, as they are particular ideas, vanish and cease, and are reduced to their causes, i.e., bulk, figure, and motion of parts.

I do not see that these sentences can be taken to mean that Locke is here insisting that our ideas of the primary qualities of objects faithfully and in all cases reproduce the specific qualities of these objects as they exist independently of us. The contrast which he is drawing between the primary and the so-called secondary qualities does not rest upon the fact that our ideas of the latter fail to be accurate and consistent in their delineation of objects; he is not arguing, for example, that what we see at one time as red, or taste as sweet, may at some other time appear purple, or taste bitter to us. Rather, his concern is to deny that redness or sweetness, purple or bitter, ever exist in nature independently of our perception of them. And the point of his argument is that the primary qualities of objects (qualities such as bulk, number, figure, and motion) do so exist. Thus, the difference between the two classes of ideas is a difference with respect to their relevance for a description of the characteristics of

61 Cf. note 49 above.
those objects which exist independently of our perceptions, and which, by their actions on our sense organs, are responsible for all of the ideas of sensation which we possess. That this really is Locke's concern in this passage, and that he is not concerned with whether our specific ideas of the macroscopic properties of objects are veridical, can also be seen by noting that in this passage he is speaking of the “bulk, number, figure, and motion of the parts of fire or snow” (the italics are mine): these parts actually possess such qualities “whether any one's senses perceive them or no.” Therefore, I do not believe it plausible to hold that in Section 17 Locke is to be interpreted as putting forward a doctrine concerning the relation between the perceived shape of an object and the real shape of that object.

Nonetheless, as we have noted, whatever may be the case with respect to Section 17, the opening sentences of Section 18 deal with “a piece of manna of sensible bulk” and seem to be directly concerned with the question of perceived shape. However, in order to interpret these sentences correctly we must also look at what follows immediately upon them. This examination constitutes the second step in my attempt to show what Locke actually wishes to hold in the passage in question.

Immediately after stating that “motion and figure are really in the manna, whether we take notice of them or no,” Locke goes on to state that manna (the laxative, and not the heavenly nourishment) “by the bulk, figure, texture, and motion of its parts, has a power to produce the sensations of sickness, and sometimes of acute pains or gripings in us.” The point which he wishes to make in this passage is that whiteness and sweetness are not to be taken as residing in the manna any more than are the sickness and pain which it is capable of causing in us. In other words, Locke is reverting to precisely the same point which he made in Section 17 concerning the difference in ontological status between the primary qualities and the so-called secondary qualities. Considering the context of the intervening sentences, it would seem odd to interpret them in such a way as to lend support to the traditional view of Locke's doctrine: one would have to assume that in the midst of a discussion of what characteristics are possessed by physical objects independently of the
Locke's Realism

reactions of our organisms to them, and what characteristics are not to be regarded as existing independently of those reactions, Locke suddenly introduced three sentences concerning the epistemological question of whether our ideas of shape and motion exactly resemble what is to be found in these objects. I do not say that Locke (because of a confusion, or for some other reason) might not have done precisely this. However, before assuming that he did do so, it would be well to see if some other interpretation of the critical passage might not be at least as plausible as that interpretation which upholds the traditional view of Locke's theory.

It will be recalled that in the sentences here at issue Locke says: "A piece of manna of sensible bulk is able to produce in us the idea of a round or square figure; and by being removed from one place to another, the idea of motion." This sentence can, without strain, surely be taken to signify that from the observation of bodies which are sufficiently large to be sensed, we derive our ideas of roundness, of squareness, of figure in general, and of motion. Thus far, then, nothing has been said concerning the resemblance of the idea of the particular shape of this sensed object to its actual, or inherent, shape, nor of any correspondence between its perceived motion and its actual motion. However, Locke then appears to raise the latter question, for he says: "this idea of motion represents it as it really is in the manna moving." However, the syntax of this phrase is difficult: to what does the word "it" refer? I can only understand Locke to mean what might be paraphrased in saying: "This idea of motion, which we have derived from observing a piece of manna of a sensible bulk being moved from one place to another, represents a characteristic which truly qualifies a piece of manna when it is moved." In short, the passage may, I submit, be interpreted as stating that our idea of motion, which we have derived from experience, does represent a characteristic which exists in nature independently of our experience. And when this poorly constructed phrase is taken in this sense, the following phrase takes on similar meaning, for Locke says: "a circle or square are the same, whether in idea or existence, in the mind or in the manna." And Locke immediately continues in the same vein: "And this [i.e., these char-
acteristics], both motion and figure, are really in the manna, whether we take notice of them or no." In none of these statements do I therefore find any reason to assume that Locke should be interpreted as saying that the specific shape which we perceive exactly resembles the true shape of the object. On the contrary, Locke’s statements, for all their peculiar syntax, seem to me more naturally interpreted if he is held to be discussing the ontological status possessed by that which we term figure or motion, and that he is only contending that such ideas represent features of an independent physical world, whereas sickness and pain, and whiteness and sweetness, do not.

I have labored over the interpretation of this small segment of Locke’s chapter on the primary and secondary qualities in order to show that what might at first glance seem to disprove my interpretation of his doctrine is in fact wholly consistent with it. There are, however, other passages in which Locke holds that our ideas of the primary qualities of macroscopic objects do faithfully depict characteristics of these objects; his distinction between the primary and the secondary qualities of objects is not therefore to be taken as merely applying to the insensible parts of bodies. We must now see why this is the case.

Let us assume with Locke that the insensible parts of bodies all necessarily possess qualities of extension, solidity, figure, and mobility, but that they do not, in themselves, possess any qualities corresponding to color, or taste, or sound. If, now, a number of these minute particles of matter come together, may we not speak of that group of particles as itself possessing extension, or solidity, or figure, or mobility? It would surely seem so, for some such groups occupy a larger region of space than do others, and some will resist penetration or separation more than do others; therefore, it is wholly natural to speak of these groups of particles as extended and as being solid in varying degrees, etc. In short, the qualities which Locke attributed to each particle of matter are also attributable to groups of such particles. He was therefore able to say that our ideas of the extension, solidity, figure, and mobility of macroscopic objects resemble what exists in these objects independently of us, and thus that our ideas
of the primary qualities of macroscopic objects really resemble qualities possessed by those objects as they exist independently of us.

Nonetheless, I wish to insist that this concern with the perceived size, shape, solidity, or mobility of sensed objects is not the basic aspect of Locke's doctrine of the primary qualities: it is really only an addendum to his main point, which concerns the fact that these qualities exist in the insensible particles of all material objects. This is perhaps most clearly brought out in Section 22 when Locke states:

I have in what just goes before been engaged in physical inquiries a little further than perhaps I intended. But, it being necessary to make the nature of sensation a little understood; and to make the difference between the qualities in bodies, and the ideas produced by them in the mind, to be distinctly conceived, without which it were impossible to discourse intelligibly of them;—I hope I shall be pardoned this little excursion into natural philosophy; it being necessary in our present inquiry to distinguish the primary and real qualities of bodies, which are always in them (viz., solidity, extention, figure, number, and motion, or rest, and are sometimes perceived by us, viz., when the bodies they are in are big enough singly to be discerned), from those secondary or imputed qualities, which are but the powers of several combinations of those primary ones, when they operate without being directly discerned.

The upshot of our argument, which is well summarized by the above summary statement made by Locke himself, is that the basis on which Locke established his theory of the primary qualities was his atomism; it was not his aim to attempt to establish the nature of physical objects by examining the sensible ideas which we had of them. Thus, instead of viewing Locke's doctrine of the primary and secondary qualities as a doctrine which rests on an analysis of differences among our ideas, his doctrine is to be understood as a theory of physical entities, and of the manner in which our ideas are caused. To this extent the Berkeleian criticism of Locke's distinc-

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82 I have noted only one passage in which Locke's distinction between the primary and the so-called secondary qualities might be supposed to rest not on causal analysis, but on features of ideas considered merely as elements within our experience. This is to be found in the Essay, Bk. II, Ch. VIII,
tion between primary and secondary qualities is wholly beside the point, for it rests on an assumption which Locke did not share—that all distinctions concerning the nature of objects must be based upon, and verified by, distinctions discernible within the immediate contents of consciousness.53

It may seem mistaken to hold that Locke did not intend to distinguish between primary and secondary qualities in terms of a distinction among the immediate data of consciousness, for his discussion of the issue is to be found at the end of his treatment of simple ideas, and the chapter in which it occurs is entitled “Some Further Considerations Concerning Our Simple Ideas of Sensation.” Were my view to be accepted, one might think that Locke should not have placed his discussion of the qualities of bodies at this point, but should only have introduced such a discussion in connection with our complex ideas of the nature of substances. And this, in fact, is true: the chapter in question does actually belong with his discussion Sec. 21, where he contrasts the consistency of the testimony of our senses with respect to primary qualities with the contradictions among our ideas of the secondary qualities. He says:

If we imagine warmth as it is in our hands, to be nothing but a certain sort and degree of motion in the minute particles of our nerves or animal spirits, we may understand how it is possible that the same water may, at the same time, produce the sensations of heat in one hand and cold in the other; which yet figure never does, that never producing the idea of square by one hand which has produced the idea of a globe by another.

However, the context of this passage is an examination of how our ideas of the secondary qualities depend upon the effects on our organisms of the “texture” of the insensible parts of objects, and the contention that we are not deceived by tactile impressions of shape plays no significant part in the discussion—it is simply mentioned and dropped. In other passages, for example in his discussions of the “reality” of our simple ideas (Bk. II, Ch. XXX, Sec. 2) and in his discussion of the “adequacy” of our simple ideas (Bk. II, Ch. XXXI, Sec. 2), the distinction between our ideas of the primary and secondary qualities is not said to rest upon differences to be found within these ideas considered as ideas, but upon knowledge of their causes.

53 Berkeley would, of course, attack Locke’s reliance upon physical theory, seeking to prove that it too must also rest on data which are confined to the immediate contents of consciousness. With that argument I am not here concerned: I only wish to point out that in so far as the Berkeleian position rests on identifying Locke’s distinction between primary and secondary qualities with a distinction between two types of ideas of macroscopic objects, it is wholly unfair to Locke’s argument as well as to his aim.
of the nature of individual substances, and not primarily with his discussion of simple ideas.

Oddly enough, this point is almost always overlooked: among the better-known commentaries, only Gibson departed from Locke's own order of exposition and discussed the question of the primary qualities in connection with his discussion of Locke's view of substances. Yet in Draft B, to which other more recent commentators have had access, the two topics are discussed together, as I would claim that they should have been. Now, actually it is not difficult to see precisely how Locke, subsequently to the writing of Draft B, came to separate them by fourteen intervening chapters. Chapter VIII opens with a discussion of the fact that all of our simple ideas are "positive" ideas; i.e., it opens with Locke insisting that an idea which depends upon "a privative cause" is no less a positive and simple idea than one which depends upon some active power in the object: cold is no less a simple, positive idea than heat, nor black than white, etc. Thus, the six opening sections of Chapter VIII fit naturally into the end of Locke's discussion of simple ideas. And if we ask why it was necessary to introduce this discussion, the answer clearly lies in Locke's recognition of the fact that when we are discussing ideas qua ideas we should not draw distinctions between them on the basis of their causes. As he says in the comparable passage in Draft B, "it being one thing to know the idea of black or white, and quite another to examine what kind of particles it must be, and how ranged in their superficies, to make it appear black." Thus it was not unreasonable (if such a warning were necessary, as Locke clearly believed that it was) that he should have added this

54 Draft C also separates the discussion of primary and secondary qualities from the discussion of our complex ideas of substances. Aaron's account of the relevant passages of Draft C (Aaron, John Locke, pp. 61–63) may suggest that there was an additional reason for the introduction of Chapter VIII where it is, viz., that Chapter VII had a more extended discussion of our idea of power, and included a mention of the primary attributes of matter and spirit. However this may be, the reasons which will here be adduced are of themselves sufficient to explain the order of these chapters.

55 Draft B, p. 118.

56 In the Essay (Bk. II, Ch. VIII, Sec. 3) the warning is explicitly directed against those "philosophers" (i.e., natural scientists) who study the theory of colors. After discussing this point, Locke immediately turns to warn others
discussion at the end of his general treatment of simple ideas. On the other hand, it is impossible to make this point without presupposing, as Locke obviously does, that some ideas depend upon active powers, while others are caused in us by the relative absence of these powers. This presupposition involves distinguishing between *ideas* (as being in our minds) and *qualities* (as being in bodies), and this distinction immediately leads to a discussion of the primary, or original, qualities of bodies and the so-called secondary qualities. Thus, having introduced the discussion of the positive nature of all of our ideas into the discussion of simple ideas, Locke was necessarily led into a discussion of the nature of material substances. But why, then, we may ask, did he not immediately go on in the Essay (and in Draft C), as he had in Draft B, to discuss the nature of substances? The answer to this lies in the fact that to talk of the distinction between a quality in an object and an idea in our minds is to raise questions concerning the roles of sensation and judgment in perception, and thus Locke was led into his chapter concerning perception, and from there to his other psychological chapters on memory, etc. The latter, after all, concern what the mind does with the simple ideas, and they have a bearing on the theory of how our complex ideas are formed; they are therefore by no means out of place. Nonetheless, it is necessary to insist that we cannot ultimately separate what Locke has to say concerning the primary qualities of material objects from what he has to say concerning our complex ideas of substances, and it is in my opinion unfortunate that most commentators have done precisely this. I wish then to turn to the question of how Locke's chapter entitled “Of Our Complex Ideas of Substances” it to be interpreted.

not to equate their ideas with the qualities of objects (*ibid.*, Sec. 7). Thus, like anyone upholding a representative theory of perception, he must argue against both the naïve realism of common sense and the tendency of some scientists to substitute a physical cause for a perceived quality.

In Section 4 of this chapter (I, 167), Locke even suggests a psychophysical explanation of how “privative causes” affect us.
III

It would be presumptuous to hold that the reason why most commentators have failed to link Locke's discussion of primary and secondary qualities with his doctrine of substance is only to be found in the fact that the chapter on substance is separated by fourteen other chapters from that dealing with qualities and powers. Not only would commentators such as Aaron not have been misled by this fact, but the chapter on substance itself reverts to the distinction. The failure to link these chapters rests, rather, on the persistence of the view that the most essential component in Locke's analysis of our complex ideas of material substances is the notion of an unknown substrate which underlies and supports the sensible qualities of these objects. This interpretation of what is most essential in Locke's doctrine seems to me fundamentally misleading.

In order to introduce an alternative interpretation of the twenty-third chapter of Book II of the Essay, let me first call attention to the fact that both in it and elsewhere Locke distinguishes between what he terms "substance in general" and what he designates as "particular sorts of substances." Whenever he uses the singular form, "substance," or when he speaks of "pure substance in general," he is referring to an unknown and unknowable substratum; whenever he uses the plural form he is speaking not of our conception of a substratum, but of individual things, or of types of individual things. So far as I am aware, there is no passage in which Locke confuses these two distinct notions; however, many of his interpreters have unfortunately failed to follow his example.

Now, it is to be noted that the title of Locke's chapter uses the plural form, "Of Our Complex Ideas of Substances." It should also be noted that only in the first five sections of this chapter is Locke primarily concerned with the notion of a substratum. If we examine the immediately subsequent sections (Sections 6 through 14) we

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58 Cf. Essay, Bk. II, Ch. XXIII, Sec. 8 (I, 399).
59 E.g., Bk. II, Ch. XXIII, Sec. 3 (I, 392).
60 Locke himself insists very strongly on this distinction in his first letter to Stillingfleet. Cf. Works, IV, 17.
find that Locke's attention is confined to the question of how we come to know the characteristics of particular substances of varying types; for example, when he alludes to our knowledge of the properties of gold, iron, horse, man, vitriol, bread, the sun, water, diamonds, and loadstones, the notion of a substratum plays no part. In fact, this is Locke's basic contention: that the notion of a substratum or "pure substance in general" gives us no knowledge of the properties of particular substances. For example, in Draft C he said:

We have no idea of the *substance* of body or any other thing, but it lies wholly in the dark, because when we talk of or think on those things which we call natural substances, as man, horse, stone, the idea we have of either of them is but the complication or collection of those particular simple ideas of sensible qualities which we use to find united in the thing called *Horse* or *Stone*.\(^{61}\)

And in the *Essay* itself it is clear that he is concerned to attack those who placed an undue emphasis on the notion of substance in general, instead of analyzing the particular characteristics of particular types of substances. In this he was surely not only attacking Descartes but also those who stood in the Aristotelian-Scholastic tradition; unlike both of these schools of thought, he rejected the centrality of the category of substance, which for him did not represent a clear and determined idea. One can see his impatience with current uses of the term "substance" when he says:

> It helps not our ignorance to feign knowledge where we have none, by making a noise with sounds, without clear and distinct significations. Names made at pleasure neither alter the nature of things, nor make us understand them, but as they are signs of and stand for determined ideas. And I desire those who lay so much stress on the sound of these two syllables, *substance*, to consider whether applying it, as they do, to the infinite, incomprehensible God, to finite spirits, and to body, it be in the same sense;

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\(^{61}\) *Apud* Aaron, *John Locke*, p. 60. This passage is closely paralleled by the summary statement of his doctrine in the *Essay*, Bk. II, Ch. XXIII, Sec. 4, which is quoted in full in note 69, below. However, the emphasis in the two is slightly different: Draft C better illustrates the negative side of Locke's doctrine with which I am here concerned.
and whether it stands for the same idea, when each of those three so different beings are called substances.\textsuperscript{62}

And in the same section, and in the same context, he speaks of "the promiscuous use of so dubious a term." Even clearer, is the following ironical passage:

Whatever a learned man may do here, an intelligent American, who inquired into the nature of things, would scarce take it for a satisfactory account, if, desiring to learn our architecture, he should be told that a pillar is a thing supported by a basis, and a basis something that supported a pillar. Would he not think himself mocked, instead of taught, with such an account as this? And a stranger to them would be very liberally instructed in the nature of books, and the things they contained, if he should be told that all learned books consisted of paper and letters, and that letters were things inhering in paper, and paper a thing that held forth letters: a notable way of having clear ideas of letters and paper. But were the Latin words, \textit{in hac re ncia} and \textit{substantio}, put into the plain English ones that answer them, and were called \textit{sticking on} and \textit{under-propping}, they would better discover to us the very great clearness there is in the doctrine of substance and accidents, and show of what use they are in deciding of questions in philosophy.\textsuperscript{63}

In the light of such passages one can scarcely think that it was Locke's primary concern in his chapter on substances to prove that our conception of particular substances involves the notion of an unknowable substratum.

What has served to focus undue attention on the problem of the substratum is the supposed inconsistency between Locke's theory that all ideas have their sources in sensation and reflection and his admission that in thinking of particular substances we think of their qualities as inhering in an unexperienced and unexperiencable substratum. Stillingfleet used this apparent inconsistency to attack Locke's "way of ideas"; Berkeley, on the other hand, later used it to attack Locke's realism. Yet Locke did not alter his views after

\textsuperscript{62} \textit{Essay}, Bk. II, Ch. XIII, Sec. 18.

\textsuperscript{63} \textit{Ibid.}, Sec. 20 (I, 230 f.).
Stillingfleet's attack; in fact, he apparently made only one slight change of wording in his discussion of the substratum in the fourth edition of the Essay, after he had had his exchanges with Stillingfleet. That he did not find it necessary to alter his doctrine rests on the fact that his position was not really inconsistent: he was always perfectly ready to admit that our notion of a substratum (or of substance in general) does not come to us by either sensation or reflection, and he could admit this because we do not possess a "particular distinct positive idea" regarding it. As he said in his first letter to Stillingfleet:

I never said that the general idea of substance comes in by sensation and reflection; or that it is a simple idea of sensation or reflection, though it be ultimately founded in them: for it is a complex idea, made up of the general idea of something, or being, with the relation of a support to accidents. For general ideas come not into the mind by sensation or reflection, but are the creatures or inventions of the understanding.

Throughout his discussions of the problem Locke emphasized the limitations of this general idea: he characterized it as "obscure and relative," not clear and distinct; further, he characterized it as being a supposition, not something of which we have a sensible idea. Therefore, Locke's use of the notion of a substrate is not incompatible with his doctrine of the origin of all simple ideas in sensation and reflection.

To be sure, there are a number of other points at which Locke's discussion of the substratum does lead him into difficulties and confusions. Perhaps the most salient of these is the fact that throughout his discussion of the substrate he fails to take into account his own distinction between ideas as they exist in the mind and the qualities and powers which are to be attributed to objects. For example, in

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64 Cf. Bk. I, Ch. III, Sec. 19 (I, 108, n. 1).
65 Ibid., p. 108.
66 Works, IV, 19.
67 E.g., Essay, Bk. II, Ch. XXIII Sec. 3. Also, in his first letter to Stillingfleet, Locke characterized the idea of a substratum in saying: "I have a very confused, loose, and undetermined idea of it, signified by the name substance" (Works, IV, 29).
Locke's Realism

the first and third sections of Chapter XXIII his analysis of our belief in a substrate is couched in terms of "ideas"; yet, in the intervening section it is couched in terms of "qualities." Associated with his failure in this respect there is also a confusion between our belief in the substratum as being that which explains why certain sets of ideas go constantly together, and a belief in the substratum as that in which qualities inhere.\(^68\) As the context of Section 1 of this chapter makes clear, his introduction of the substratum as an explanation of why these sets of ideas do go together is related to Locke's realism: his insistence that something must stand behind what is given in experience, causing our sensations. In Section 2 this reason is repeated in terms of the scholastic doctrine of accidents, but to it there is added the notion that every quality must inhere in a substance which serves as the ground of explanation for it. Had Locke clearly avoided a confusion between our ideas and the qualities of objects, these passages would have had to be radically revised.\(^69\)

\(^68\) To speak (as Locke does) of the substratum of a material object as being that in which ideas subsist is clearly a confusion: only qualities and powers could be spoken of as subsisting in material objects. It is also a confusion to speak as if the relation of "inhering in" were equivalent to the relation of "resulting from," as Locke does when he says in Section 1: "we accustom ourselves to suppose some substratum wherein [these simple ideas] do subsist, and from which they do result, which therefore we call substance."

\(^69\) This double confusion is evident in Locke's summary statement which makes up Section 4 of this chapter:

Hence, when we talk or think of any particular sort of corporeal substances, as horse, stone, &c., though the idea we have of either of them be but the complication or collection of those several simple ideas of sensible qualities, which we used to find united in the thing called horse or stone; yet because we cannot conceive how they should subsist alone, nor one in another, we suppose them existing in and supported by some common subject; which support we denote by the name substance, though it be certain we have no clear or distinct idea of that thing we suppose a support. (I, 395)

In the phrase italicized by Locke, "they" presumably refers to "several simple ideas of sensible qualities," but once one distinguishes between ideas and qualities it is nonsense to hold that these ideas exist in, and are supported by, anything in the horse or the stone. Therefore, when Locke says that "we cannot conceive how they should subsist alone" he is only saying that we cannot conceive how these ideas should arise in us as they do were they not caused by qualities which actually inhere in the particular substances of which
Nonetheless, after admitting that there are these confusions in Locke's exposition of his doctrine, let us see if we cannot make better sense of it if we consistently follow his injunction to distinguish between ideas as they are in the mind and qualities and powers as these exist in things.\(^7\) In doing so, let us close the gap separating Locke's discussion of qualities and powers from his discussion of our complex ideas of substances, and consider his doctrine of substance in the light of his discussion of the primary and secondary qualities of objects. Above all, in offering our interpretation let us utilize the sharp distinction which Locke himself drew between the notion of substance in general and our complex ideas of particular substances.

Our interpretation must start from the fact that Locke is perfectly clear on one point: in our ordinary experience our complex idea of any particular object involves the possession of a whole group of determinate ideas, some of which are simple ideas, and some of which (while being equally specific and determinate) are in fact complex relational ideas which can (according to Locke) be treated "for brevity's sake" as if they were simple ideas. As examples of the former we may cite the color and consistency of an object; examples of the latter are our ideas of the changes in color or consistency which a particular type of object undergoes under varying conditions.\(^7\) To this whole set of determinate and specific ideas (whether simple or not simple) we add the supposition of a substratum. Unlike these determinate ideas, the notion of the substratum is indeterminate and has no place in direct experience; yet it also is included in our overall conception of what constitutes a particular substance. Furthermore, in addition to these two types of components we must take cognizance of a third set of factors which Locke introduces into his discussion of our ideas of particular sub-

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we form our ideas. It is in this way that his original confusion of idea and quality, plus his realism, led him to confuse inference with causation. Such a confusion may well have been facilitated by a failure on Locke's part to see the full difference between his own views on explanation and earlier assumptions that the causal relation could often (or always) be interpreted in terms of what followed from the nature of a substance. (Cf. below, p. 52, and note 104; also, p. 59 f.)

\(^7\) Cf. *Essay*, Bk. II, Ch. VIII, Sec. 7–8.

\(^7\) Cf. *ibid.*, Ch. XXIII, Sec. 7 (I, 397–98).
stances: namely, those qualities and powers which exist in these substances independently of the sensible effects through which we become cognizant of them.\textsuperscript{72} As we have seen, such qualities and powers are not to be equated with our sensible ideas, according to Locke. Thus, contrary to the usual interpretation of Locke's doctrine of substances, in which (following his own error) the distinction between ideas and qualities is not consistently maintained, an analysis of our various beliefs about particular substances will involve three different types of components, not two. We shall have to take into account all of the specific sensible ideas which we have concerning such substances; we shall also have to include the supposition of a substratum; and, third, we shall, in addition, have to take into account the specific qualities and powers which reside in the substances themselves, in so far as we can determine what these qualities and powers actually are.

In order to interpret Locke's doctrine we must now see how these three discriminable sets of components are related to one another. First we may note that in Chapter XXIII, no less than in Chapter VIII, Locke always assumes that our ideas of objects are caused by the action of the primary qualities on us, and that these primary qualities are the qualities of the particles of which material objects are composed.\textsuperscript{73} In the second place, as we have already seen, Locke assumes that one of the reasons why we are driven to suppose the existence of a substrate is that we cannot avoid believing that there is something which causes our ideas of sensation.\textsuperscript{74} Taken in conjunction with the previous proposition this suggests that our notion of a substratum is connected with the notion of the inner, atomic constitution of objects, since both are regarded by Locke as being causally related to our ideas of the sensible qualities of things. To this rather surprising linkage of the notions of an unknown and

\textsuperscript{72} Cf. \textit{ibid.}, Sec. 9, where Locke reintroduces his classification of the qualities and powers of objects, repeating what he had said in Ch. VIII.

\textsuperscript{73} Cf. \textit{ibid.}, Secs. 9 to 12.

\textsuperscript{74} It must be noted that Locke's own analysis of how we come by our ideas of cause and effect (\textit{ibid.}, Ch. XXVI, Sec. 1) and of power (Ch. XXI, Sec. 1) do not really permit him to hold this view. Nonetheless, regardless of the inconsistency, there can be no doubt that he does so.
unknowable substratum and of the atomic constitution of material objects we shall later return. Here, however, we must in the third place note that, in spite of this linkage, the substrate and the primary and original qualities of objects cannot be equated with one another in any simple, straightforward fashion. One significant difference between them is that no analysis of the qualities and powers of an object in any way clarifies the indeterminate general idea of a substrate; unlike the inner constitution of things, the substrate remains merely "a something," and this locution "signifies no more, when so used, either by children or men, but that they know not what." Thus, the second and third of our remarks seem to stand in conflict with one another, the second suggesting a close affiliation between the substratum of an object and the internal constitution upon which its powers depend, whereas the third involves a fundamental opposition between them.

I suggest that this conflict can be at least partially resolved if we make the hypothesis that in his analysis of the role of the substrate in our complex ideas of substances Locke was confining his attention to what we take objects to be like on the basis of our ordinary daily experience with them; in other words, that in discussing the notion of substance in general he was not considering objects in the light of what could be discovered about them by the methods of the new experimental philosophy. On this interpretation our supposition of a substratum enters into our complex idea of a particular substance, but it does so as an idea only: it is not to be identified with the

75 In Section 3 of Chapter XXIII there is one passage which can be taken as evidence—though not conclusive evidence—that Locke actually was linking these notions in his own mind. In speaking of how we take note of the fact that certain ideas regularly accompany one another, Locke says that we therefore suppose them "to flow from the particular internal constitution, or unknown essence of that substance." If we may take "the unknown essence" to be equivalent to the substratum in this passage—as I believe the context permits us to do—we have textual evidence in the Essay itself for connecting the general notion of a substrate and the atomic constitution of material objects. As another example of a case in which Locke is apparently linking the unknown substratum and the ultimate physical constitution of bodies, Section 2 of Draft A may be cited: in it he equates the substrate with "substance or mater."

76 Essay, Bk. II, Ch. XXIII, Sec. 2.
properties of the object itself. Its place in our ordinary conception of an object is, so to speak, that of a surrogate for what in the object is material and exists independently of us—i.e., that which is not merely an idea or group of ideas. Put in different words, our conception of a substratum is an indeterminate and general notion standing for something in the object which makes that object a self-subsisting thing, that is, a thing which (in Cartesian language) needs nothing else in order to exist. Thus, so far as our ordinary experience is concerned, this vague notion of a substrate corresponds to the atomist's view of the role of atoms as the original and unchanging matter on which all sensible appearances depend. However, our indeterminate notion of a material substrate stands in need of correction by inferences based on the observation of the powers of objects: it is the atomic constitutions of objects, not "pure substance in general," which cause the ideas of them which we actually have, and which also cause the effects, whether perceived or unperceived, which objects have upon one another. Thus, no appeal to the notion of substance in general—no use of this category—will solve the problem of what objects are like. Yet Locke believes that we inescapably form this indeterminate general notion, since he holds—as his later discussion of sensitive knowledge clearly shows—that we are inescapably realists in our ordinary experience and cannot doubt that in perceiving or acting we are being affected by material objects which are independent of us.

To this interpretation of Locke's doctrine of the substrate it might be objected that ordinary men do not ordinarily think in terms of some substrate underlying specific sensible qualities; in other words, that such a notion is not part of our conception of the everyday world of material objects. I would agree that it is not, and that in this sense Locke was undoubtedly wrong in his description of our experience. Nonetheless, when one considers the extent to which his predecessors had emphasized the notion of substance as being

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77 Locke speaks of the substratum as "that unknown common subject, which inheres not in anything else." And he speaks of it as the cause of the union of our ideas "as makes the whole subsist of itself." (Both quotations are from the Essay, Bk. II, Ch. XXIII, Sec. 6.)

78 Ibid., Bk. IV, Ch. XI, Secs. 2 and 3.
that which underlies all qualities and events, it is not surprising that Locke was misled by a philosophical theory when he came to describe our everyday experience of the world. Furthermore, as we have noted, the sections of the chapter which are concerned with the notion of the substrate have a polemical and negative cast: in them Locke is attempting to argue that through the use of this indeterminate and general notion we can get no concrete knowledge of the nature of material objects. It is only through the determinate ideas of the relations of objects to one another, and through noting how our simple sensible ideas of them change under changing conditions, that we can obtain reliable knowledge of what exists independently of us. Thus, the burden of this chapter is that we must appeal to experience, and not to the notion of substance in general, to ascertain the nature of objects. The experience to which we must appeal is, in the first instance, our ordinary observation in daily life. However, Locke points out that continuous with this everyday knowledge there are the sorts of observations made by smiths and by jewelers, and such observations, as we know from Boyle, were themselves regarded as being continuous with the experimental philosophy, in which more refined and systematic inquiry serves to establish the various powers of specific types of objects. In support of the fact that this is Locke's view, it is to be noted that in his discussion of our knowledge of particular substances he is led to talk of what we would see if we had microscopical eyes, of what the blood is really like, of how we experimentally establish the nature of gold, etc. It is in the light of such knowledge of the specific natures of specific types of bodies that he ridicules relying upon a notion of substance in general as constituting any part of an explanation of what occurs in nature. To be sure, he admits—and in fact insists—that in our perceptual experience we always find ourselves using this notion of something underlying whatever surface qualities we observe an object to have; however, ordinary perceptual experience, while useful in all of the concerns of life, does not for Locke reveal the nature of material objects as they are in themselves.79

79 Cf. *ibid.*, Bk. II, Ch. XXIII, Secs. 12 and 13. Whether Locke believed that we would also think in terms of a substrate
Locke's Realism

As a final justification for this interpretation of Locke's doctrine of substance I shall now show how it fits with what he says concerning the real and the nominal essences of substances.

It is in Book III of the Essay that Locke draws his distinction between the real and the nominal essences of substances. One of the passages in which he does so reads as follows:

Essence may be taken to be the very being of anything, whereby it is what it is. And thus the real internal, but generally (in substances) unknown constitution of things, whereon their discoverable qualities depend, may be called their essence . . . .

[However,] the learning and disputes of the schools having been much busied about genus and species, the word essence has almost lost its primary signification: and, instead of the real constitution of things, has been almost wholly applied to the artificial constitution of genus and species. It is true, there is ordinarily supposed a real constitution of the sorts of things; and it is past doubt there must be some real constitution on which any collection of simple ideas co-existing must depend. But, it being evident that things are ranked under names into sorts or species,

if we had "microscopical eyes" is not clear. The one passage which might be taken to bear on this problem might suggest that he believed that we would. However, the passage is ambiguous since one cannot be sure that in it Locke is speaking of the characteristics of the atomic particles, or whether he has in mind the solidity and extension of molar matter. The passage reads as follows:

"If any one should be asked, what is the subject wherein colour or weight inheres, he would have nothing to say, but the solid extended parts; and if he were demanded, what is it that solidity and extension adhere in, he would not be in a much better case than the Indian . . . [etc.]" (Bk. II, Ch. XXIII, Sec. 2; italics mine).

This passage may seem to lend support to an interpretation of Locke's doctrine of substance which has been advanced by John Yolton, but which seems to me fundamentally mistaken. Yolton claims that "a physical object for Locke was defined as being composed of three elements: secondary qualities or powers, primary qualities, and substance or substratum" ("Locke's Unpublished Marginal Replies to John Sargent," p. 555). I think it a mistake to regard the notion of a substratum as being connected with the actual qualities of an object, rather than as being an indeterminate notion connected with our sensible ideas of such qualities. The fact that Yolton takes the former alternative forces him to say that "the real essence of any physical object is hidden away in the unknowable but necessary substratum." As we shall see immediately below, this would seem to contravene Locke's own words as to what constitutes the real essence of a material object.
only as they agree to certain abstract ideas, to which we have annexed those names, the essence of each genus, or sort, comes to nothing but that abstract idea which the general ... name stands for . . . .

These two sorts of essences, I suppose, may not unfitly be termed, the one the real, the other nominal essence. 80

Locke illustrates the difference between these two meanings of the term “essence” in the following way:

The nominal essence of gold is that complex idea the word gold stands for, let it be, for instance, a body yellow, of a certain weight, malleable, fusible, and fixed. But the real essence is the constitution of the insensible parts of that body on which those qualities and all the other properties of gold depend. 81

This distinction between the nominal and the real essences of things is identical with the distinction which I have just drawn between Locke’s account of our ordinary notions of particular substances and what he believes that an analysis of objects in terms of their internal parts would disclose. He himself draws such a contrast between two ways of looking at things when, in Book III of the Essay, he says:

For, though perhaps voluntary motion, with sense and reason, joined to a body of a certain shape, be the complex idea to which I and others annex the name man, and so be the nominal essence of the species so called: yet nobody will say that complex idea is the real essence and source of all those operations which are to be found in any individual of that sort. The foundation of all those qualities which are the ingredients of our complex idea, is something quite different: and had we such knowledge of that constitution of man . . . we should have a quite other idea of his species, be it what it will: and our idea of any individual man would be as different from what it is now, as is his who knows all the springs and wheels and other contrivances within the famous clock at

80 Bk. III, Ch. III, Sec. 15 (II, 26-27). One finds the same distinction in Boyle, and many of Locke’s illustrations resemble his; however, Boyle does not use the same terminology. (For relevant passages, cf. Works, III, 18-19, 27.)

81 Essay, Bk. III, Ch. VI, Sec. 2.
Strasburg, from that which a gazing countryman has of it, who barely sees the motion of the hand, and hears the clock strike, and observes only some of the outward appearances.82

Thus, the nominal essences of things are not to be considered as being like their real essences. In other words, the ordinary way in which we form our conceptions of substances through putting together a series of simple ideas which regularly accompany one another (and by adding the supposition of a substrate in which they inhere) does not provide us with ideas corresponding to the actual mode of existence of material things.83

If this be doubted, consider Locke's attack on the Aristotelian-Scholastic doctrine that species exist in nature.84 He regards our distinction between species as artificial, that is, as being made by men, and not found in nature independently of man. As he says:

*Our distinct species are nothing but distinct complex ideas, with distinct names annexed to them.* It is true that every substance that exists has its peculiar constitution, whereon depend those sensible qualities and powers we observe in it; but the ranking of things into species (which is nothing but sorting them under several titles) is done by us according to the ideas that we have of them: which, though sufficient to distinguish them by names, so that we may be able to discourse of them when we have them not present before us; yet if we suppose it to be done by their real internal constitutions, and that things existing are distinguished by nature into species, by real essences, according as we

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82 Ibid., Sec. 3. As we shall see, Boyle uses the illustration of the Strasburg clock in a similar connection (cf. below, p. 90 f.), and Locke himself again refers to it in Section 9 of this same chapter.

83 Perhaps the clearest indication of Locke's desire to avoid assigning to our complex ideas of substances any status in the independent physical world is to be found when he points out the difference between using the word "gold" as a generic name signifying "the complex idea which I or any one else calls gold" and using it to refer not to an idea but a thing, "a particular piece of matter, v. g. the last guinea coined" (cf. *ibid.*, Sec. 19).

84 Locke's attack on the independent reality of species was in many places couched in terms of biological facts, and must have been of at least indirect influence in undermining the biological theory of the invariance of species. (For some of his discussions of this topic, cf. *ibid.*, Ch. III, Secs. 13 and 17, and Ch. VI, Secs. 12, 16, 17, 22, 23, 26, 27, 29, and 34.)
Locke of course found those who stood in the Aristotelian-Scholastic tradition guilty of this type of mistake: it was this identification of species with real essences that he rightly regarded as underlying their attempts to explain natural events in terms of substantial forms. In fact, almost the whole of this chapter, "Of the Names of Substances," may be considered as an attack on that tradition. However, it is no less an attack on the adequacy of our ordinary, common-sense view that sensory experience teaches us the true differences which exist between different types of material objects. As Locke repeatedly points out, our sorting of things into distinct species, classifying them and naming them according to linguistic traditions and the needs of life, does not give us a correct conception of their natures. However, the limitations of our knowledge of material objects does not rest on this alone. According to Locke there are at least three other reasons why the sensible properties on the basis of which we distinguish among material objects of various sorts do not serve as adequate indicators of the true natures, or real essences, of these objects. In the first place, as we have noted, our sensible ideas do not accurately depict the actual physical constitu-

85 Ibid., Sec. 13.
86 Cf. ibid., Sec. 10.
87 Cf. ibid., Secs. 29 and 30, part of whose argument may be given in the following truncated form:

Where we find the colour of gold, we are apt to imagine all the other qualities comprehended in our complex idea to be there also . . . . But though this serves well enough for gross and confused conceptions . . . it requires much time, pains, and skill, strict inquiry and long examination to find out what, and how many, those simple ideas are, which are constantly and inseparably united in nature, and are always to be found together in the same subject. Most men, wanting either time, inclination, or industry enough for this, even to some tolerable degree, content themselves with some few obvious and outward appearances of things, thereby readily to distinguish and sort them for the common affairs of life (II, 80-81).

Similarly, he says: "It is their own collections of sensible qualities that men make the essences of their several sorts of substances; and that their real internal structures are not considered by the greatest part of men in the sorting of them" (ibid., Sec. 24).
tion of these bodies. In the second place, as we here find Locke insisting, and as he frequently insists elsewhere, our experience of the particular characteristics of bodies is limited, and never exhaustive. Therefore, since all of the characteristics of an object depend upon its real essence, the limitations of our experience will preclude us from saying that we have discovered what constitutes the real nature of these objects. In the third place, as Locke also suggests, there may well be powers in objects by virtue of which they affect other objects, and are affected by them, which we never suspect "because they never appear in sensible effects." And, in fact, Locke believes that a good part of the nature of any object depends upon its covert relations with other objects, as organisms depend upon their environment; yet in framing a complex idea of these objects we are prone to overlook these relations. As he says:

We are wont to consider the substances we meet with, each of them, as an entire thing by itself, having all its qualities itself, and independent of other things; overlooking for the most part, the operations of those invisible fluids they are encompassed with, and upon whose motions and operations depend the greatest part of those qualities which are taken notice of in them, and are made by us the inherent marks of distinction whereby we know and denominate them . . . . The qualities observed in a loadstone must needs have their source far beyond the confines of that body; and the ravage made often on several sorts of animals by invisible causes . . . evidently show that the concurrence and operations of several bodies, with which they are seldom thought to have anything to do, is absolutely necessary to make them be what they appear to us, and to preserve those qualities by which we know and distinguish them. We are then quite out of the way, when we think that things contain within themselves the qualities that appear to us in them.89

Thus once again we see that Locke has drawn a distinction between our complex ideas of substances and the actual nature of material substances as they exist independently of us. The former are com-

88 Ibid., Bk. II, Ch. XXIII, Sec. 9 (I, 400).
89 Ibid., Bk. IV, Ch. VI, Sec. 11 (II, 260–61).
posed of a congeries of simple ideas of sensation, plus the suppo-
sition of a substratum in which those ideas inhere, and to which we
affix a name; the latter are objects which possess qualities distinct
from the sensible ideas which they cause in us, and bear no neces-
sary relationship to the classificatory schemes under which we are
apt to arrange them.

If this be true, how then—one may ask—can Locke claim to know
that there are substances distinct from us, or know anything con-
cerning what their natures may be like?

IV

Before answering these questions, and thus answering the funda-
mental question of this essay—in what measure Locke may be said
to have been consistent in his realism—it will be well to offer a more
general interpretation of Locke’s thought than the present study
has yet contained.

In this connection we should first take cognizance of Locke’s
purpose in writing the Essay. What he sought to ascertain was “the
origin, certainty, and extent of human knowledge.” This search was
not, however, motivated simply by a theoretical interest in the prob-
lem of knowledge as such. In the first place, as is evident from his
friend James Tyrell’s remark,90 and as is also surely clear from
internal evidence in the drafts of the Essay, Locke was interested
in the problem of knowledge for the light it could throw on the
possibility of settling disputes which concerned moral and religious
questions.91 This early concern seems to be echoed in a significant
passage near the end of the Essay:

Since our faculties are not fitted to penetrate into the internal
fabric and real essences of bodies; but yet plainly discover to us
the being of a God, and the knowledge of ourselves, enough to

91 For example, in Draft A, immediately following a discussion of substances,
there is a very brief paragraph (#3) on relations in general, but this is then
followed by an extended paragraph (#4) on moral relations.
lead us into a full and clear discovery of our duty and great concernment; it will become us, as rational creatures, to employ those faculties we have about what they are most adapted to, and follow the direction of nature, where it seems to point us out the way. For it is rational to conclude, that our proper employment lies in those inquiries, and in that sort of knowledge which is most suited to our natural capacities, and carries in it our greatest interest, i.e., the condition of our eternal estate. Hence I think I may conclude, that morality is the proper science and business of mankind in general.92

However, in addition to this moral concern, there was another powerful motive which led Locke to undertake his prolonged analysis of human knowledge: he wished to correct the false pretensions of system-builders and dogmatists. This motivation is clear as early as Locke's fragment, De Arte Medica, dated 1668.93 In it system-building, and the idle terminological disputes and dogmatic assertions connected with system-building, are characterized by Locke as the chief obstacles to the improvement of useful knowledge; and system-building in its turn is regarded as springing from man's pride of intellect. As Locke said:

. . . True knowledge grew first in the world by experience and rational observations; but proud man, not content with the knowledge he was capable of, and which was useful to him, would needs penetrate into the hidden causes of things, lay down principles, and establish maxims to himself about the operations of nature, and then vainly expect that nature, or in truth God, should proceed according to those laws which his maxims had prescribed to him; whereas his narrow and weak faculties could reach no further than the observation and memory of some few facts produced by visible external causes, but in a way utterly

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92 Bk. IV, Ch. XII, Sec. 11.
93 The fragment is given in Bourne, The Life of John Locke, I, 222 ff., but the relevant passage is also given in Fraser's edition of the Essay, I, xxiv f. The date of this fragment is significant in that it shows Locke's basic reason for a concern with the problem of knowledge some three years before the discussion out of which the Essay sprang. However neither it nor the other medical fragments seem to me to justify Romanell's view that the Essay originated in problems of medical methodology.
beyond the reach of his apprehension;—it being perhaps no absurdity to think that this great and curious fabric of the world, the workmanship of the Almighty, cannot be perfectly comprehended by any understanding but His that made it. Man, still affecting something of the Deity, laboured by his imagination to supply what his observation and experience failed him in; and when he could not discover (by experience) the principles, causes and methods of nature's workmanship, he would needs fashion all these out of his own thought, and make a world to himself, framed and governed by his own intelligence. This vanity spread itself into many useful parts of natural philosophy; and by how much the more it seemed subtle, sublime, and learned, by so much the more it proved pernicious and hurtful, by hindering the growth of practical knowledge . . . .

This distrust of human pretensions to infallible knowledge, this interest in what is of practical concern to man, and this contempt for purely theoretical systems, are perhaps most clearly evident in an extended entry which Locke made in his Notebook in 1677 while he was in Montpellier, working on the Essay. They are, of course, also reflected, though in softer focus, in the “Epistle to the Reader,” which stands as Locke's introduction to the Essay. But one might wonder why, if these were Locke's real concerns, the first draft of the Essay should have started with a discussion of how our notions of particular substances are formed by a compounding of simple ideas of sense, to which there is added the vague idea of a substrate. Why should the problem of what constitutes our knowledge of a material object such as the sun, or of what comprises our knowledge of gold, be the starting point of Locke's discussion?

In the first place, we may note that Locke is here concerned to show how we get our knowledge of concrete entities with which we are concerned in the ordinary affairs of life. He is not concerned with the abstract nature of matter, nor is he concerned to discuss cosmology: we gain our knowledge of the physical world through experience of specific objects. In the second place, he is accounting for what we know of the nature of particular substances in terms of

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94 This entry is reprinted in Aaron and Gibb, An Early Draft of Locke's Essay, pp. 83–90. It is also given in King, The Life of John Locke, I, 161–71.
Locke's Realism

experienced sensible qualities which they can be observed to have, not in terms of substantial forms. In the third place, in his account of our conception of particular substances, and of types of substances, he introduces the effect of names on our notions of particular substances, showing how these names, though useful, may mislead us. And, finally, he shows us that the more complete our knowledge of the powers of things—e.g., of the ductility of gold—the more we may be said to know of them. In all these respects what he has to say reminds one immediately and unmistakably of Boyle's concerns when Boyle was arguing for the new corpuscular or experimental philosophy.

That there should be this connection between Locke's starting point in the first draft of the Essay and Boyle's philosophy is not strange. And that Locke had in mind defending this philosophy—and the method of work of the virtuosi of the Royal Society—is not only to be expected from his remark on Sydenham, Huyghens, Boyle, and Newton in the "Epistle to the Reader," but can be documented by his Notebook entry of 1677 to which I have just referred. In that entry he does insist that the mind of man "findes it self lost in the vast extent of space, and the least particle of matter puzzles it with an inconceivable divisibility"; he also admits that perhaps man's mind cannot know "the essence of things, their first originall, their secret way of workeing and the whole extent of corporeall beings," nor "the nature of the sun and stars . . . and 1000 other speculations in nature." However, here as elsewhere, Locke also insists that "this state of our mindes however remote from that perfection whereof we our selves have an Idea, ought not however to discourage our endeavours in the search of truth or make us thinke we are incapable of knowing any thing because we cannot fully understand all things." And in fact what Locke finds us chiefly incapable of understanding are "the more generall and forain parts of nature," not what we have experience of. This passage is worth quoting at length:

... what need have we to complaine of our ignorance in the more generall and forain parts of nature when all our bisinesse lies at hand why should we bemoane our want of knowledg in the par-
ticular apartments of the universe when our portion lies only here in this little spot of earth, where we and all our concernments are shut up. Why should we thinke our selves hardly dealt with that we are not furnishd with compasse nor plummet to saile and fathom that restlesse and innavigable Ocean of the Universall matter motion and space since if there be shoars to bound our voyaige and travaile, there are at least noe commoditys to be brought from thence serviceable to our uses nor that will better our condition, and we need not be displeased that we have not knowledg enough to discover whether we have any neighbours or noe in those large bulks of matter we see floating in that abyss, and of what kinde they are since we can never have any communication with them nor enterteine a commerce that might turne to our advantage . . . .

The knowledge which can be turned to our advantage is twofold: natural and moral knowledge. And of natural knowledge Locke singles out for attention such knowledge as can provide us with the means of life and can improve our material lot.

Here then is a large feild for knowledg proper for the use and advantage of men in this world viz To finde out new inventions of dispatch to shorten or ease our labours, or applying sagaciously togethers severall agents and patients to procure new and benefciall productions whereby our stock of riches (i.e., things usefull for the conveniencys of our life) may be increased or better preservd. And for such discoverys as these the minde of man is well fitted.

If with this passage in mind one recalls that Boyle, when writing to Marcombes, spoke of the Royal Society as "our new philosophical college that values no knowledge but as it hath a tendency to use." And if one also recalls that Boyle and his colleagues considered the

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95 Journals appended to Draft A, in Aaron and Gibb, An Early Draft of Locke's Essay, p. 86. (Also to be found in King, The Life of John Locke, I, 165.)
96 Journals appended to Draft A, in Aaron and Gibb, An Early Draft of Locke's Essay, p. 85. (Also in King, The Life of John Locke, I, 163.)
new science as the way to achieve useful inventions, then one can see that there is no conflict between this practical aim and Locke’s satisfaction that even though men must remain ignorant of so much, we do have “abilityts to improve our knowledge in experimentall naturall philosophy.”98 What this new philosophy can achieve is to give us a more correct knowledge of particular substances (not of “pure substance in general”), and this knowledge, like the philosophers’ stone, could transform and control nature for our advantage.

Supposing, then, that we interpret Locke as being, in his fundamental philosophic motivation, a follower of this Baconian tradition, a tradition which included Boyle among its most eminent examples: what can we then say concerning Locke’s views regarding our knowledge of substances?

In the first place we must note a distinction which Locke draws between “the proper science and business of mankind in general” and “the lot and talent of particular men.” In the passage from his chapter entitled “Of the Improvement of our Knowledge” which I have already cited,99 he had insisted that “our faculties are not fitted to penetrate into the internal fabric and real essences of bodies,” and from this he had argued that the proper employment of these faculties lay in the field of morality. However, in stating this conclusion he drew an explicit contrast between what is true of “mankind in general” and what is true of certain individuals, saying: “I think I may conclude that morality is the proper science and business of mankind in general . . . as several arts, conversant about several parts of nature, are the lot and private talent of particular men.” The results of the cultivation of these arts, as he then goes on to show by using the illustration of the discovery of iron, are of inestimable value for the generality of mankind. Having said this, he adds, “I would not, therefore, be thought to disesteem or dissuade the study of nature.” Thus, we must read much of Locke’s discussion concerning our inability to know the real essences of bodies as being directed against any claim that our senses and our common experience

99 Essay, Bk. IV, Ch. XII, Sec. 11; cited above, pp. 46 f.
furnish us with such knowledge—that such knowledge is, in other words, open to the generality of mankind. If this distinction is legitimate, as I take it to be, it would go far to substantiate my reading of Locke’s discussion of substances, for according to that interpretation (it will be recalled) there was at least an implicit contrast between the origins of our ideas of bodies as these were derived from immediate sensible ideas, and the real essences of bodies with which experimental philosophy sought to deal.

To be sure, Locke consistently denies that anyone—whether plain man or scientist—can know the real essence of any individual material object. However, to interpret his insistence on this point, we must once again note the manner in which he uses the term “knowledge.” For him “knowledge,” or “science,” was to be distinguished from “opinion” and “probability”: that which was not certain could not be characterized as science or as knowledge. Apart from the special case of “sensitive knowledge,” knowledge for Locke consisted in the immediate intuitive or the mediate demonstrative perception of the agreement or disagreement among our ideas. However, Locke saw no way in which any such knowledge concerning material substances could be established. For Descartes,

As we have previously noted (pp. 13 f., above), Locke’s Essay is not a treatise on the nature, scope, and limits of scientific method; it is directed primarily to showing the origin, certainty, and extent, of what we, today, are apt to call “the plain man’s” knowledge.

If I am not mistaken, the opening sentences of Section 14 of Book IV, Chapter XII, should also be read in the light of this distinction between everyday knowledge and the results of scientific inquiry. That sentence reads: “But whether natural philosophy be capable of certainty or no, the ways to enlarge our knowledge, as far as we are capable . . . . (etc.).” On my interpretation, Locke is here drawing a contrast between “natural philosophy” and “our knowledge.”

Cf. above, p. 12.

“Sensitive knowledge,” for Locke, is not knowledge of the particular qualities which external objects possess, but is only the belief (which he takes to be justified) that there is an external world causing our simple ideas of sensation, and that these ideas, therefore, represent the action on us of something which is independent of us.

At times, by inadvertence, he did use the term “knowledge” in a broad sense which included probability as well as “knowledge” proper. For example, in his chapter on the improvement of our knowledge (Essay, Bk. IV, Ch. XII), he used the term to cover the results of our inquiries into the nature of material
and for the Aristotelians, at least some of the properties of objects were explicable in terms of the nature of the substances whose properties they were. This was true of the non-accidental properties for the Aristotelians. It was also characteristic of Descartes' ideal of knowledge in which effects were to be explained through their causes, that is, properties through the substances which served as their grounds. However, Boyle reversed this order, and insisted that knowledge proceeds from effects to causes; knowledge for him was to be observational and empirical, not rational. And, so far as particular material substances were concerned, Locke wholly agreed with Boyle's method. It was because he agreed with this method, and because he none the less adopted the stricter Cartesian definition of "knowledge," that Locke refused to characterize our information concerning material bodies as knowledge.

substances as well as to apply to the demonstrative sciences of morals and mathematics.


105 Cf. Works, IV, 72-73.

It is also worthy of note that Colin Maclaurin, in his Account of Sir Isaac Newton's Philosophical Discoveries, takes it to be a characteristic difference between Newton and Descartes that the Cartesians "express contempt for that knowledge of causes which is derived from the contemplation of their effects, and are unwilling to condescend to any other science than that of effects from their causes" (p. 14). In this connection he cites Descartes' Principles, Part III, Prop. 4.

106 For example, note the following statement which occurs in the Essay, Bk. II, Ch. XXXI, Sec. 6:

The complex ideas we have of substances . . . cannot be the real essence, . . . for then the properties we discover in that body would depend on that complex idea, and be deducible from it, and their necessary connexion with it be known; as all properties of a triangle depend on, and, as far as they are discoverable, are deducible from the complex idea of three lines including a space. But it is plain that in our complex ideas of substances are not contained such ideas, on which all the other qualities that are found in them do depend.

It is also to be noted that in one passage Locke relates our lack of demonstrative knowledge concerning material objects to the fact that the foundation of all of our knowledge rests on our senses, and he suggests that immaterial spirits (and of course God) could have demonstrative knowledge of the various
Finally, in order to interpret Locke's doctrine concerning the limitations of our knowledge of the real essences of material substances we must draw a distinction between knowing the general properties of such substances and knowing their individual natures. As I have attempted to show, it seems indubitable that Locke believed that all material objects were composed of atoms, and that these atoms possessed certain properties, which he termed their primary qualities. There seem to be no grounds for holding that he was ever skeptical of the warrant of this belief. On the other hand, it is no less clear that he denied that we have any means of directly discerning, or even accurately inferring, the particular sizes, shapes, number, or motions of the particles which go to make up any specific object, or even any specific type of object. These two views are not, however, incompatible: we need merely draw the suggested distinction between the possibility of knowing the general properties possessed in common by all material substances, and the specific properties and powers of material things from a knowledge of their ultimate natures—presumably from a knowledge of their insensible parts. He says:

The whole extent of our knowledge or imagination reaches not beyond our ideas limited to our ways of perception. Though yet it be not to be doubted that spirits of a higher rank than those immersed in flesh may have as clear ideas of the radical constitution of substances as we have of a triangle, and so perceive how all their properties and operations flow from thence (Bk. III, Ch. XI, Sec. 23).

For example, Locke says:

Our faculties carry us no further towards the knowledge and distinction of substances, than a collection of those sensible ideas which we observe in them; which, however made with the greatest diligence and exactness we are capable of, yet is more remote from the true internal constitution from which those qualities flow, than, as I said, a countryman's idea is from the inward contrivance of that famous clock at Strasburg, whereof he only sees the outward figure and motions. There is not so contemptible a plant or animal, that does not confound the most enlarged understanding. Though the familiar use of things about us take off our wonder, yet it cures not our ignorance. When we come to examine the stones we tread on, or the iron we daily handle, we presently find we know not their make; and can give no reason of the different qualities we find in them. It is evident the internal constitution, whereon their properties depend, is unknown to us: for to go no further than the grossest and most obvious we can imagine amongst them, What is that texture of parts, that real essence, that makes lead and antimony fusible, wood and stones not? (ibid., Ch. VI, Sec. 9).
Locke's Realism

properties of different, specific substances. In discussing the adequacy of our ideas of material substances, Locke himself draws this distinction, saying:

The particular parcel of matter which makes the ring I have on my finger is forwardly by most men supposed to have a real essence, whereby it is gold; and from whence those qualities flow which I find in it, viz., its peculiar colour, weight, hardness, fusibility, fixedness, and change of colour upon a slight touch of mercury, &c. This essence, from which all these properties flow, when I inquire into it and search after it, I plainly perceive I cannot discover: the furthest I can go is, only to presume that, it being nothing but body, its real essence or internal constitution, on which these qualities depend, can be nothing but the figure, size, and connexion of its solid parts.

And in the same passage, in stating his opposition to the doctrine of substantial forms, he adds:

I have an idea of figure, size, and situation of solid parts in general, though I have none of the particular figure, size, or putting together of parts, whereby the qualities above mentioned are produced; which qualities I find in that particular parcel of matter that is on my finger, and not in another parcel of matter, with which I cut the pen I write with.108

Thus, whatever may have been his skepticism regarding our ability to penetrate into the secret material constitution of individual things, this skepticism did not cast doubt on the acceptability of the atomistic hypothesis as a general explanation of all of the powers which we observe that particular types of bodies are capable of displaying.

Bearing these points in mind, we are now in a position to examine Locke's doctrine concerning the extent of our knowledge of physical objects, taking the term "knowledge" in that broader signification which includes all well-grounded beliefs concerning these objects. The key to Locke's analysis of such knowledge lies in what he has to say concerning "powers."

In both of his discussions of the differences between the primary

108 Ibid., Bk. II, Ch. XXXI, Sec. 6 (I, 507, 508).
Philosophy, Science, and Sense Perception

and the secondary qualities of objects, Locke includes, in addition to these qualities, what he terms "powers."\(^{109}\) While his terminology in these two passages is not identical, in both of them it is clear that the powers of an object are what we should call dispositional properties of that object; that these dispositional properties depend upon the nature of the qualities inhering in the minute parts of the objects, that is, on the object's primary qualities; and that the so-called secondary qualities are themselves to be classed among the powers of objects, being their powers to affect our sense organs in a particular way. The difference between the so-called secondary qualities of an object and its other powers is, according to Locke, the difference between something immediately affecting our sense organs, and something which does so mediately. As he says:

We immediately by our senses perceive in fire its heat and colour; which are, if rightly considered, nothing but powers in it to produce those ideas in us: we also by our senses perceive the colour and brittleness of charcoal, whereby we come by the knowledge of another power in fire, which it has to change the colour and consistency of wood. By the former, fire immediately, by the latter, it mediately discovers to us these several powers.\(^{110}\)

By classing these two sorts of powers together, Locke—as we shall now see—actually paves the way for treating our ordinary knowledge of material objects as continuous with that more refined analysis of these objects which can be attained by experimental investigators. As will be recalled, his analysis of our ordinary conceptions of material objects consists in holding that we group together whatever simple ideas of sensation regularly accompany one another, and to this we add the supposition of an unknown substratum in which these subsist. These sensible ideas now turn out, however, to be merely powers in the object causing us to have these particular sensations, rather than others. Therefore, there is no reason why Locke should not hold that when one object is observed to induce changes in some other object, this dispositional property of the first object should not be regarded as a quality of that object just as much as are its so-called secondary qualities. To be sure, in our sensory

\(^{109}\) Cf. *ibid.*, Ch. VIII, Secs. 9–10, and Ch. XXIII, Secs. 9–10.

\(^{110}\) *Ibid.*, Ch. XXIII, Sec. 7 (I, 398).
experience we do not ordinarily so regard it: the observed color or felt smoothness or hardness of a bar of magnetized iron seem to be "qualities" of that piece of iron in a way in which its active power to attract iron filings, or its passive power to melt at a certain temperature, do not seem to be. However, Locke classes all such properties as powers, and does so in spite of the fact that, as he recognizes, and as we have noted, the former are in fact simple ideas, whereas the latter are not.111 This thesis on his part allows him to hold that our observations of the behavior of various types of objects under varying conditions form no less a part of an adequate complex idea of these substances than whatever sensible qualities these substances present to us immediately in sensory experience. And this of course allows him to hold that the more refined observations and investigations of various types of substances which are carried on by jewelers and by smiths, and also by chemists and other natural philosophers, are to be regarded as successive improvements upon what our own direct and untutored sensory observation reveals.

This continuity between our ordinary untutored conceptions of the properties of a particular type of substance and the almost limitless possibilities of further knowledge concerning such substances is traced out by Locke in such passages as the following:

Whosoever first lighted on a parcel of that sort of substance we denote by the word gold, could not rationally take the bulk and figure he observed in that lump to depend on its real essence, or internal constitution. Therefore those never went into his idea of that species of body; but its peculiar colour, perhaps, and weight, were the first he abstracted from it, to make the complex idea of that species. Which both are but powers; the one to affect our eyes after such a manner, and to produce in us that idea we call yellow; and the other to force upwards any other body of equal bulk, they being put into a pair of equal scales, one against another. Another perhaps added to these the ideas of fusibility and fixedness, two other passive powers, in relation to the operation of fire upon it; another, its ductility and solubility in aqua regia, two other powers, relating to the operation of other bodies, in changing its outward figure, or separation of it into insensible parts. These, or parts of these, put together, usually make the

111 Cf. above, p. 36.
complex idea in men's minds of that sort of body we call gold.

But no one who hath considered the properties of bodies in general, or this sort in particular, can doubt that this, called gold, has infinite other properties not contained in that complex idea. Some who have examined this species more accurately could, I believe, enumerate ten times as many properties in gold, all of them as inseparable from its internal constitution, as its colour or weight.\^112

However, Locke is not for this reason contemptuous of our ordinary conceptions of objects, since these are, by and large, sufficient for the needs of our daily lives. In fact, he suggests that if our senses were more acute, and enabled us directly to perceive the "secret composition and radical texture of bodies," this capacity would be inconvenient for our ordinary conduct and well-being.\^113 In this connection, as always, he recommends that we be content with the position in which God has placed us. Nonetheless, as we have noted, Locke explicitly states that he does not for this reason wish to be thought to "disesteem or dissuade the study of nature,"\^114 and he then puts forward his view of how such knowledge should proceed:

In the knowledge of bodies, we must be content to glean what we can from particular experiments: since we cannot, from a discovery of their real essences, grasp at a time whole sheaves, and in bundles comprehend the nature and properties of whole species together . . . . He that shall consider how little general maxims, precarious principles, and hypotheses laid down at pleasure, have promoted true knowledge, or helped to satisfy the inquiries of rational men after real improvements; how little, I say, the setting out at the end has, for many ages together, advanced men's progress, towards the knowledge of natural philosophy, will think we have reason to thank those who in this latter age have taken another course.

This is unmistakably the method of Boyle and of those others whom

\^112 Essay, Bk. II, Ch. XXXI, Secs. 9 to 10. Cf. Bk. III, Ch. VI, Secs. 30 and 31.
\^113 Cf. ibid., Bk. II, Ch. XXIII, Secs. 12 and 13; also Bk. IV, Ch. XII, Sec. 11.
\^114 Ibid., Bk. IV, Ch. XII, Sect. 12 (II, 351 f.).
he classed as master builders, when in the “Epistle to the Reader” he defined his own task as that of clearing away some of the rubbish that lay in the path of human understanding.\textsuperscript{115}

Now, if this praise of the new experimental philosophy is taken seriously, what can one say of Locke’s earlier and apparently far more skeptical discussion of the extent of human knowledge?\textsuperscript{116} In that well-known discussion he apparently insists on certain ineradicable limitations to human knowledge: we can never be certain what qualities will coexist with what other qualities, nor can we discover how the sensible ideas which we have of objects are connected with the qualities which they possess. However, this passage is by no means incompatible with what we have been claiming to be Locke’s position. The way in which his inquiry is couched in these paragraphs is in terms of whether we can ever have necessary knowledge of “the agreement or disagreement of our ideas in co-existence,” and this he takes to mean whether we can see a necessary connection between various simple ideas (or ideas of powers) which go to make up our complex ideas of substances. It should occasion no surprise (nor should it be taken as in any way justifying skepticism) that, for Locke, “the simple ideas whereof our complex ideas of substances are made up are, for the most part, such as carry with them, in their own nature, no \textit{visible necessary} connexion or inconsistency with any other simple ideas, whose coexistence with them we would inform ourselves about.”\textsuperscript{117} In short, what he is attempting to show throughout these sections is that:

Our knowledge in all these inquiries [concerning the co-existence of certain sensible ideas] reaches very little further than our experience. Indeed some few of the primary qualities have a necessary dependence and visible connexion with one another, as figure necessarily supposes extension; receiving or communicating

\textsuperscript{115} As we have had occasion to note, the chief opponents of Locke doubtless were the Scholastics. However, he (like Boyle) was also critical of the alchemists, as can be seen in a passage concerning the methods of “the philosophers by fire” which he added in the second edition to Bk. IV, Ch. III, Sec. 16. And it is possible that what he has to say about “systems,” “hypotheses,” and “principles” in Bk. IV, Ch. XII, Secs. 12 and 13, might have been directed against Descartes.

\textsuperscript{116} \textit{Ibid.}, Ch. III, Secs. 9 to 16 (II, 199–206).

\textsuperscript{117} \textit{Ibid.}, Sec. 10.
motion by impulse, supposes solidity. But though these, and perhaps some of our other ideas have; yet there are so few of them that have a visible connexion one with another, that we can by intuition or demonstration discover the co-existence of very few of the qualities that are to be found united in substances.\footnote{Ibid., Sec. 14 (II, 203); cf. Bk. IV, Ch. VI, Sec. 7, and Ch. XII, Secs. 9–10.}

In other words, we must consult experience (which means sense experience) to learn the nature of particular types of substances: we cannot discover either by intuition or by demonstration what their precise properties will be; thus we can never have certainty in our opinions concerning them. However, nowhere in this passage does Locke evince the least doubt that objects do exist in their own right, independently of us; that they possess the characteristics which atomism assigns to them; and that it is because of their atomic constitution (and doubtless also because of our natures) that they cause us to form the ideas which we do form of them.

To those who might wish to challenge the grounds on which Locke assumed that material objects existed independently of our minds, Locke himself proposed an answer in his treatment of our sensitive knowledge; and, if my interpretation of his doctrine of the substratum is correct, he also proposed a closely connected sort of answer when he claimed that, when our ideas regularly accompany one another, we cannot believe that they occur as they do without supposing some underpinning which is responsible for their concurrence. I should not wish to claim that Locke's reply to the challenges which came to be posed by Berkeley and by Hume are adequate. However, it cannot be denied that Locke did see the problem, in outline at least, and did attempt to propose a solution to it. What seems missing in his system is something else: it is the absence of any attempt to justify the acceptance of that atomism which runs throughout his discussion of human knowledge. It is my opinion that Locke did not feel obliged to justify this theory because he not unnaturally viewed it as an empirically based conclusion drawn from the experimental inquiries of his day. I say "not unnaturally," since, as we shall now see, this is also the way in which at least two of the new "master builders," Boyle and Newton, regarded the corpuscularian philosophy.